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THE PLANT DISEASE REPORTER

Issued By

PLANT DISEASE EPIDEMICS
and
IDENTIFICATION SECTION

AGRICULTURAL RESEARCH SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

SOME NEW AND IMPORTANT PLANT DISEASE OCCURRENCES AND DEVELOPMENTS IN THE UNITED STATES IN 1954

Supplement 235

December 15, 1955

(1) The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Plant Disease Epidemics and Identification Section serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

THE PLANT DISEASE REPORTER

PLANT DISEASE EPIDEMICS AND IDENTIFICATION SECTION

Horticultural Crops Research Branch Plant Industry Station, Beltsville, Maryland

SOME NEW AND IMPORTANT PLANT DISEASE OCCURRENCES AND DEVELOPMENTS IN THE UNITED STATES IN 1954

Compiled by Nellie W. Nance

Plant Disease Reporter
Supplement 235 December 15, 1955

Some 1953 reports on plant diseases are included in this summary which were not published when the 1953 summary was completed. Otherwise this summary includes important diseases of 1954 compiled for the most part from reports to the Plant Disease Epidemics and Identification Section and articles in Phytopathology. Reports listed in the tables are not usually noted again in the text.

WEATHER OF 1954. General Summary. -- The year 1954, among the driest and warmest on record, was notable for drought and destructive storms. Drought and record-breaking heat, prevailing over the southern half of the Country during the critical growing season, seriously damaged crops and reduced streamflow to a minimum of record. Hurricanes, moving up the Atlantic Coast in August, September, and October, were responsible for the major portion of the year's storm damage which totaled nearly $900,000,000.

Temperature and precipitation, however, furnished little basis for complaint in most sections of the Pacific States and the northern half of the Nation, although a number of localities in the latter area were seriously affected by destructive storms. Timely rains provided ample moisture for above average crop production and periods of unconfortable heat were usually short. In the North Central Interior mild weather in January and February favored livestock and reduced fuel costs. The Pacific States enjoyed one of the coolest summers on record.

Some other unusual weather features occurring during the year were: New national low temperature record of -69.7° at Rogers Pass, Mont., on January 20, the mildest February on record in the North Central Interior, the hottest summer on record in parts of the South, duststorms reminiscent of the 1930's in the western portions of the lower Great Plains in February and March, the highest flood in the Rio Grande River in history in June (caused by heavy rains which fell during the passage of hurricane Alice), the heaviest snowfall since February 1899 in parts of the east Gulf region during March, a record number of tornadoes for a single year, damaging floods in New England during May and in Iowa during June, a record-breaking heat wave in the central Mississippi Valley during June and again in July, and unprecedented rains in California during August.

DROUGHT. -- In the western portions of the lower Great Plains drought persisted through the third straight year. In February and March duststorms contributed to the damage of small grains and pastures. In the latter month losses from wind and dust in Colorado alone amounted to $5,000,000. April rains brought relief to Texas and Oklahoma and were helpful in some other sections. Spotted rains during May and the summer months were of very limited benefit after mid-June owing to the intense heat and dry soil. The autumn was very dry, but many sections received helpful rains in December.

The drought in the Southeast, centered in northern Florida and southern portions of Georgia and Alabama, developed during the first 3 months with less than 25 percent of normal rainfall in January and less than 50 percent in February and March. Continued below-normal rainfall combined with intense heat from mid-June to mid-October damaged crops severely. A few early crops were a complete loss, and total crop production in South Carolina was the least in 50 years.

Drought spread over the entire South in June and continued through the summer and fall. Crops suffered, soil moisture was depleted, and streamflow dwindled to or near the minimum of record. Some municipal water supplies became so low that rationing was necessary. December rains replenished surface moisture in many sections, but subsoil moisture generally remained depleted.

PRECIPITATION. -- The year's precipitation was below normal over approximately two-thirds of the Country. Much of the South, the western and lower portions of the Great Plains, and the central part of the Great Basin of the far West had less than 75 percent of normal and some sections in these areas had less than 50 percent. In South Carolina, northern Florida, and

southern portions of Alabama and Georgia the year was the driest on record. For the period June through September Spartanburg, S. C., had a total of only 3.76 inches which was 12.31 inches below normal. The yearly total of 28.66 inches at the Weather Bureau Office in Pensacola, Fla., represented a deficiency of 32.94 inches or only 47 percent of normal. In parts of the Southeast heat and drought cut early crops 50 percent or more.

Precipitation was above normal in regions near the Canadian Border, along the West Coast, in scattered sections of the far Southwest, and in the southern portion of the Florida Peninsula. In most of these areas precipitation fell at timely intervals throughout the year.

Snowfall was below normal in most areas where snow is a common occurrence. Heavy falls were relatively fewer and less extensive than is normally the case, thereby causing little interference to transportation. The cover, however, was generally adequate to protect winter grains and pastures from severe freezes, particularly the one on January 20-21 when 40-below-zero-minima occurred in several sections of the North Central Interior.

TEMPERATURE. -- Average temperatures for 1954 were normal or slightly below in Pacific coastal areas from Santa Maria, Calif., to the State of Washington and thence eastward along the Canadian Border to the Continental Divide, in the Florida Peninsula, and a few other small scattered localities in the Atlantic Coastal States, and above normal elsewhere. Plus anomalies exceeded 2^{o} in much of the central and lower Rocky Mountain State area, the central and lower Great Plains, and the central Mississippi Valley.

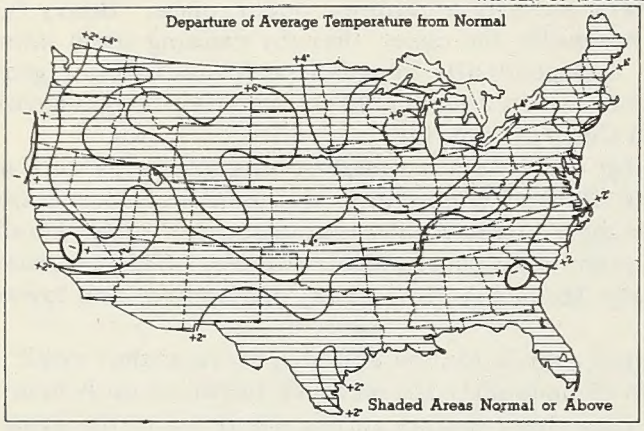
January, February and April were mild months, while March and May were rather cold. In the southern two-thirds of the Country a period of unusually hot weather began at mid-June and persisted until mid-October. Numerous all-time-high temperatures occurred in the area in June and July and many seasonal records in August, September, and October. The number of days with maxima above 100^{o} also set new records at many stations. Following a break in the heat wave in mid-October temperatures followed a more nearly normal pattern during the remainder of the year.

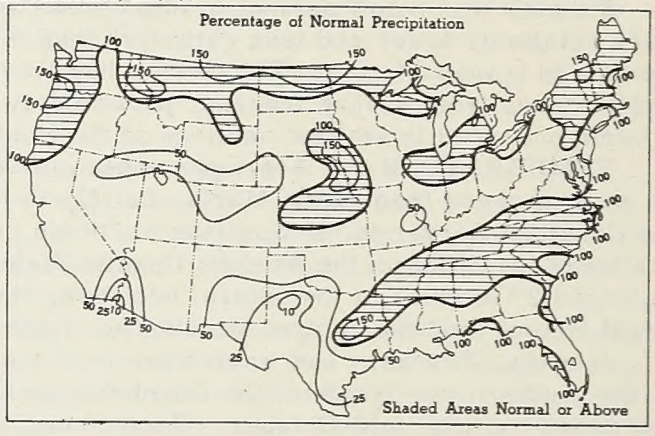
DESTRUCTIVE STORMS. -- During 1954 hurricanes accounted for 193 deaths and $755,472,500 damage, tornadoes 35 deaths and $28,367,400 damage, other windstorms 99 deaths and $30,700,900 damage, and hailstorms $72,695,600 damage - a total of 327 deaths and $887,236,400 damage to property and crops. The dollar value of losses for both hurricanes and hail set new annual records. (From Climatological Data. National Summary, Annual 1954, Vol. 5. No. 13).

The Maps on pages 138 and 139 show the temperature and precipitation for the winter of 1953-54, spring, summer, and fall of 1954.

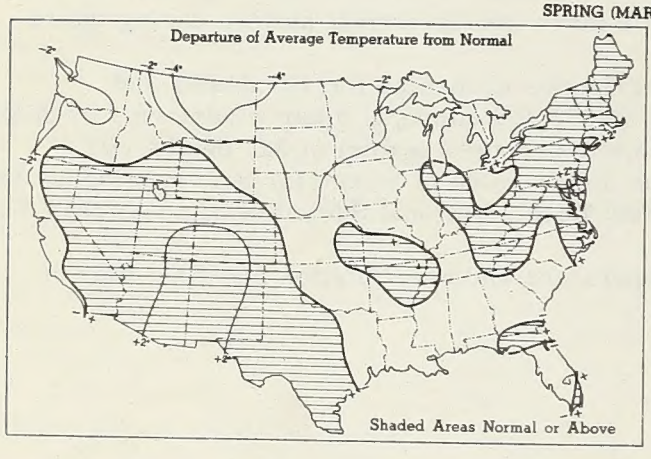
TEMPERATURE AND PRECIPITATION

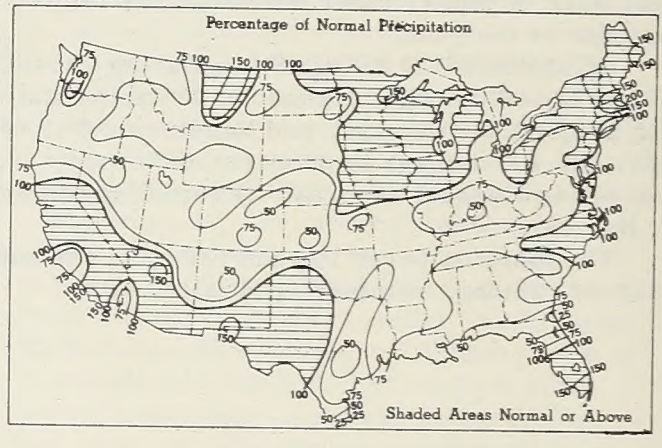
WINTER OF (DECEMBER–FEBRUARY) 1953–54



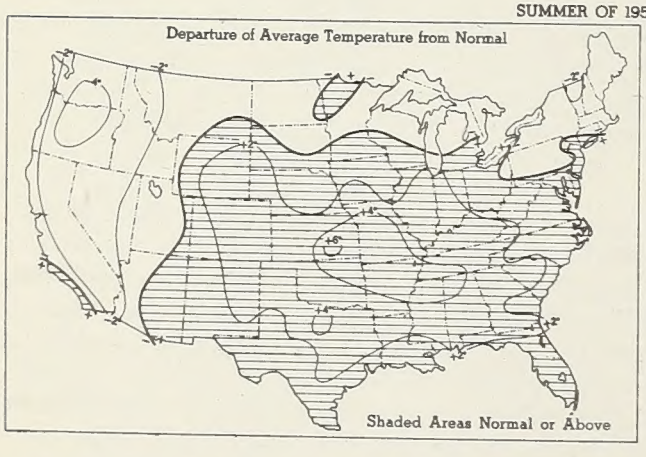


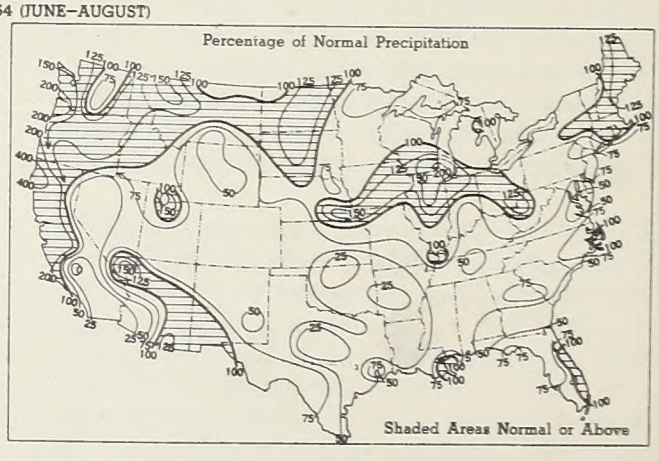
SPRING (MARCH–MAY) 1954



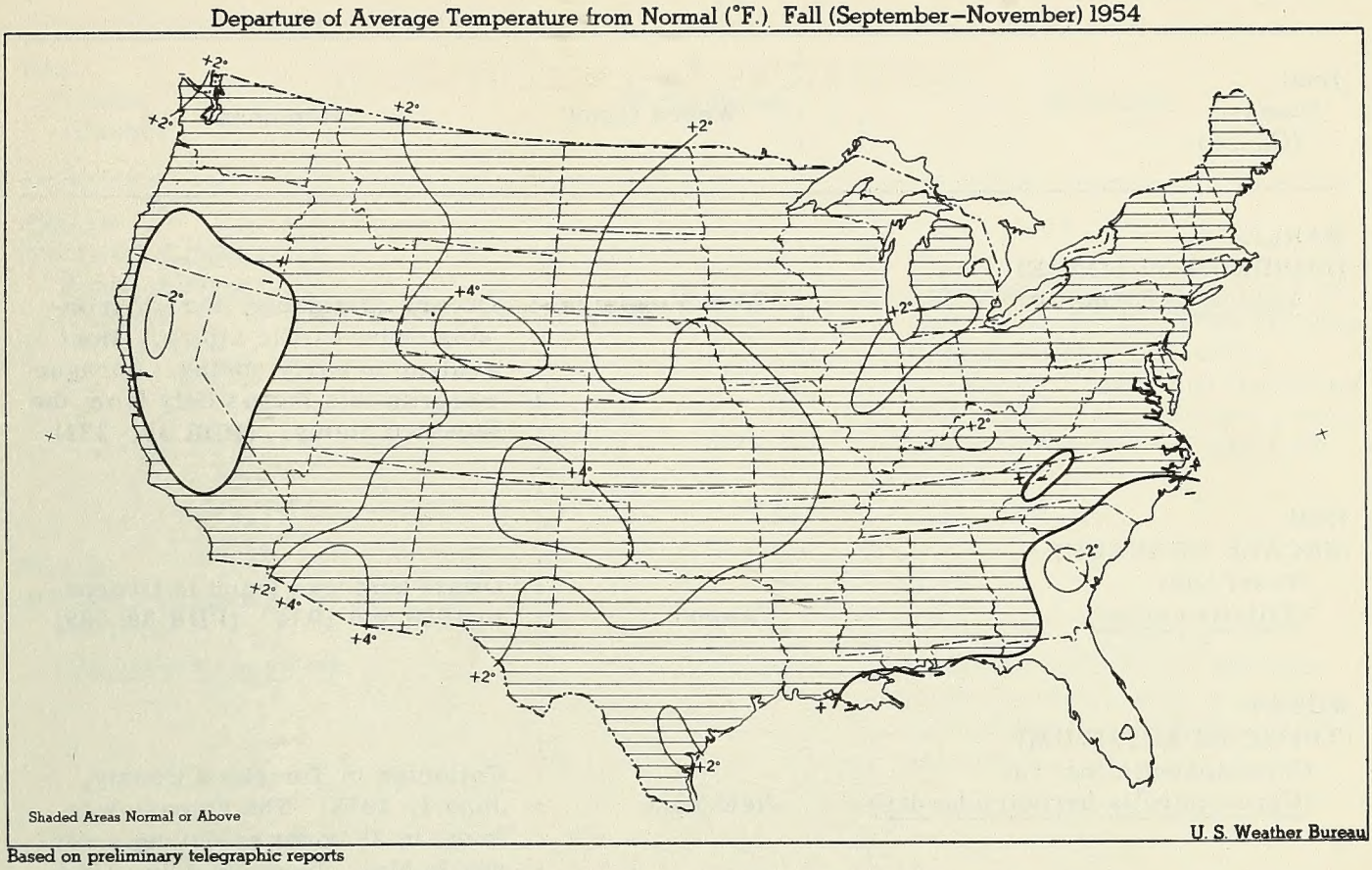


SUMMER OF 1954 (JUNE–AUGUST)



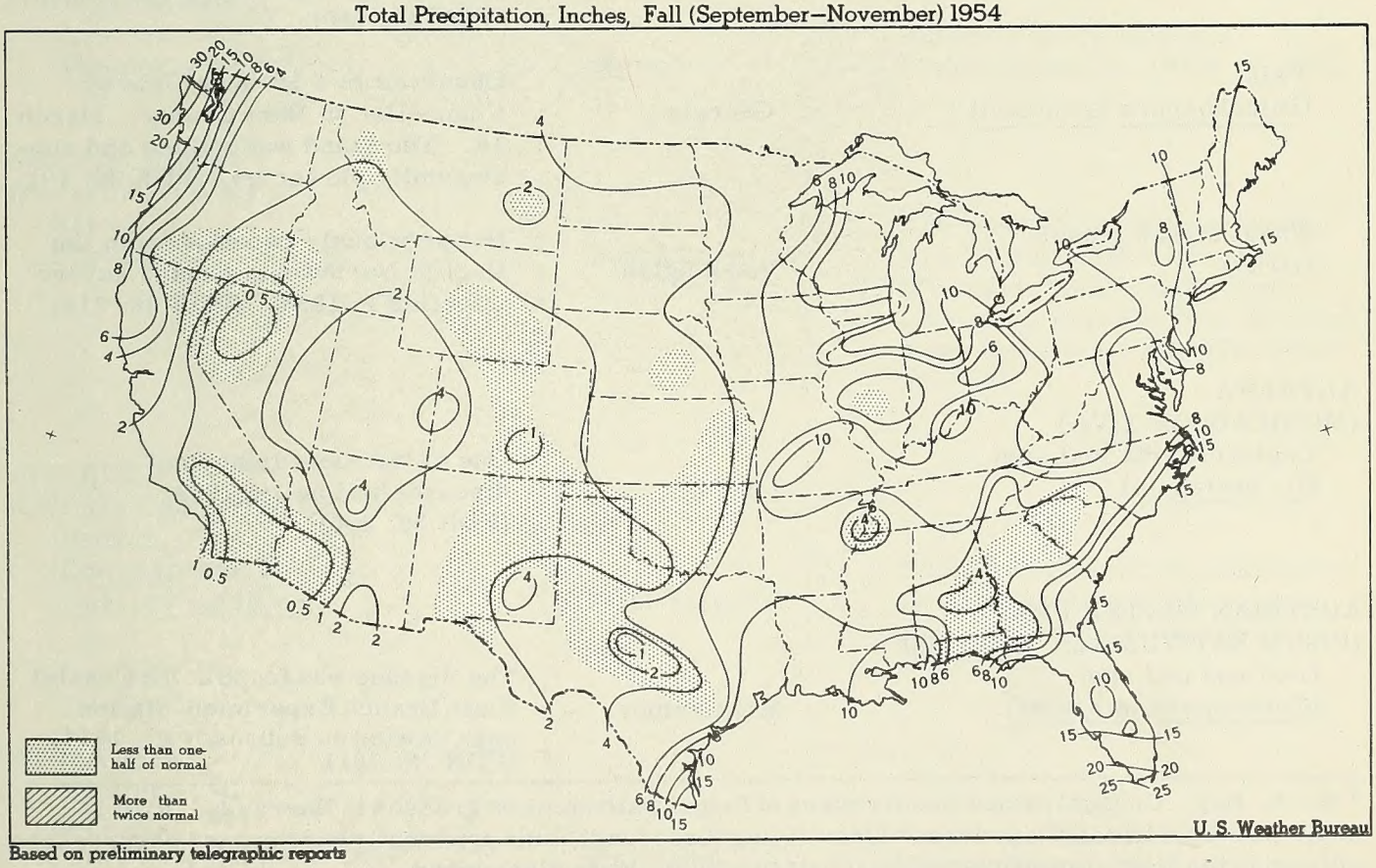


Departure of Average Temperature from Normal (°F.) Fall (September–November) 1954



Based on preliminary telegraphic reports

Total Precipitation, Inches, Fall (September–November) 1954



Based on preliminary telegraphic reports

(From Weekly Weather and Crop Bulletin National Summary, Volume 41, 1954)

Table 1. Diseases reported in States where they had not been found or reported on a particular host until 1954[1, 2].

Host Disease (Cause)	Where found	Remarks
BARLEY (HORDEUM VULGARE)		
Ascochyta hordei	West Virginia	Occurs commonly, though probably causes little injury. Most evident in early spring. Sprague records this fungus only from the Western States. (PDR 39: 332)
RYE (SECALE CEREALE)		
Dwarf bunt (Tilletia caries)	Oregon	Dwarf bunt was found in Oregon in 1953 and 1954. (PDR 39: 685)
WHEAT (TRITICUM AESTIVUM)		
Cercosporella foot rot (Cercosporella herpotrichoides)	New York	Collected in Tompkins County, June 1, 1953. The disease was found in 25 counties during a survey in May, June and July, 1954. (PDR 38: 710)
Twist (Dilophospora alopecuri)	Georgia	Observed in a 10-acre field of Chancellor in Hart County. March 16. The stand was ruined and subsequently plowed up. (PDR 39: 17)
Wheat streak mosaic (virus)	Washington	Not previously reported from the Pacific Northwest, caused severe infection in 1954. (PDR 38: 714)
ALFALFA (MEDICAGO SATIVA)		
Leptosphaeria leaf spot (L. pratensis)	Iowa	One of the most important diseases in Iowa in 1954. (PDR 39: 239)
AUSTRIAN WINTER PEA (PISUM SATIVUM var. ARVENSE)		
Leaf and pod spot (Cercospora lathyrina)	Mississippi	The disease was found at the Coastal Plain Branch Experiment Station near Newton on February 17, 1954. (PDR 38: 781)

[1] W. W. Ray. Unusual or new occurrences of fungus pathogens on grasses in Nebraska. PDR 38: 583. He stated that in the process of identifying these fungi some apparently rare or new occurrences of fungi in the State, or unreported host relationships, were discovered.

[2] Muller, Albert S., Anna E. Jenkins, and A. A. Bitancourt. Elsinoë and Sphaceloma in Florida. PDR 38: 599. Collections of Elsinoë and Sphaceloma in Florida, 1952-53, supplemented by several earlier specimens from Florida, hitherto unreported, are tabulated.

Table 1. (Continued).

Host Disease (Cause)	Where found	Remarks
PECAN (HICORIA ILLINOENSIS) Bunch disease (Virus)	New Mexico	Trees known to be affected with bunch disease have been observed in Mississippi, Louisiana, Arkansas, Texas, and Oklahoma The soil on which the trees were grown in New Mexico had a pH of 8.5.
PEACH (PRUNUS PERSICA) Fruit rot (Diplodia natalensis)	South Carolina	In July 1953, Diplodia was isolated from mature peaches grown in the vicinity of Inman, South Carolina. (Phytopath. 44: 471)
STRAWBERRY (FRAGARIA SPP.) Fruit rot (Gnomonia fructicola)	Maine	Found in early July in a Maine plantation. (PDR 38: 796)
SWEET CHERRY (PRUNUS AVIUM) Rasp leaf (Virus)	New Mexico	The infected trees were found in a 20-year-old orchard at Mountain Park. Eight localized trees in a 200-tree orchard were found to be infected. (PDR 38: 832)
RED BUD (CERCIS CANADENSIS) Dieback (Botryosphaeria ribis var. chromogena)	West Virginia	This pathogen occurs commonly in some areas and limits the use of this tree in landscaping. (PDR 39: 333)
CYCLAMEN (C. PERSICUM) Root rot (Thielaviopsis basicola)	Maryland	A severe case of cyclamen root rot was found in a greenhouse in Baltimore County. (PDR 38: 354)

Table 1. (Continued)

Host Disease (Cause)	Where found	Remarks
FLOWERING DOGWOOD (CORNUS FLORIDA)		
Anthracnose (Elsinoë corni)	West Virginia	Found in Wayne County. (PDR 39: 333)
GLADIOLUS		
Curvularia lunata	California	Found in San Diego and Alameda Counties. Took the form of a neck rot of cormel stock. Combination of high temperature and high humidity favored the disease. (PDR 38: 796)
Western aster yellows (Virus)	Kansas	In July 1954, a grower in Kansas sent 62 corms to the Plant Industry Station reporting that similar stock produced only thin multiple sprouts or failed to grow. This is the second record known to the writers of commercial loss from aster yellows in gladiolus and the first record of such loss in Kansas. (PDR 38: 739)
PEONY (PAEONIA OFFICINALIS)		
Stem and leaf spot (Gloeosporium sp.)	West Virginia	Probably the same Gloeosporium anthracnose that has been found in several of the eastern States. (PDR 39: 333)
LIPPIA CANESCENS		
Meliola sp.	Arizona	In 1953 a large Lippia planting near Phoenix was practically killed by this fungus which invaded the stems and leaves of the plants, causing conspicuous black blotches. (PDR 39: 425)
Southern blight (Sclerotium rolfsii)	Arizona	Until the summer of 1954, the disease had not been observed in Arizona. A large planting near Phoenix was found infected. (PDR 39: 425)

Table 1. (Continued)

Host Disease (Cause)	Where found	Remarks
GOATHEAD (TRIBULUS TERRESTRIS) COCKLEBUR (XANTHIUM COMMUNE) COPPER MALLOW (SPHAERALCEA ANGUSTIFOLIA) Verticillium wilt (V. albo-atrum)	New Mexico	Weed hosts not previously reported. (PDR 38: 894)
CANTALOUPE (CUCUMIS MELO) Fusarium wilt (F. oxysporum f. melonis)	North Carolina	In the summer of 1953 wilting cantaloupe plants were observed scattered throughout a 2-acre field in Warren County. (PDR 39: 334)

Table 2. Diseases found or reported in this country for the first time in 1954=*; diseases found on new hosts=**, [1].

Host Disease (Cause)	Where found	Remarks
RICE (ORYZA SATIVA) Radopholus oryzae**	Texas Louisiana	Found near Beaumont, Texas and seven locations in southwestern Louisiana. It has been reported to damage rice roots in certain Asiatic areas. (PDR 39: 69)
STRAWBERRY (FRAGARIA SPP.) New disease (resembling aster yellow virus disease)	Arkansas	The disease was almost universally present in strawberry plantings in Arkansas in May of 1954, affecting 20 percent of the plants in some fields. (PDR 38: 630)

1 John R. Hardison. New grass host records and life history observations of dwarf bunt in eastern Oregon. (PDR 38: 345).

Table 2. (Continued)

Host Disease (Cause)	Where found	Remarks
RED CLOVER (TRIFOLIUM PRATENSE)		
Curvularia leaf spot* (Curvularia trifolii)	Maryland Florida	Not previously reported in the United States, has been observed since 1950, occasionally damaging red clover in Maryland and Florida. (PDR 39: 181)
CROTALARIA SPECTABILIS		
LUPINUS DENSIFLORUS		
MEDICAGO LUPULINA		
TRIFOLIUM HYBRIDUM		
VICIA VILLOSA		
Yellow bean mosaic** (Bean virus 2)	Idaho	Artificial inoculation was made with the virus from infected sweet clover plants. (PDR 38: 621)
LOTUS ULIGINOSUS		
Leaf spot** (Cercospora loti)	Maryland Georgia	Fungus reported previously only from Hungary. Hitherto not reported on this host, found at Beltsville, Md. and near Alapha, Ga., in 1954. (PDR 39: 236)
SOYBEAN (GLYCINE MAX)		
Heterodera glycines*	North Carolina	This cyst-forming nematode has been reported from Japan and China. (PDR 39: 9)
AGROPYTON CRISTATUM A. DESERTORUM A. SIBIRICUM		Found in nursery plantings. First report of disease on A. cristatatum in North America. A. desertorum and A. sibiricum reported as new hosts. The latter reported only from Idaho. (PDR 39: 685)
Dwarf bunt (Tilletia caries)	Idaho Oregon	
ORCHARD GRASS (DACTYLIS GLOMERATA)		
Dwarf bunt** (Tilletia caries)	Oregon	Found in eastern Oregon test nursery in July 1954. (PDR 39: 685)

Table 2. (Continued)

Host Disease (Cause)	Where found	Remarks
CENTIPEDE GRASS (EREMOCHLOA OPHIUROIDES)		
Blast* (Piricularia oryzae)	Florida	Isolated from lesions on leaves in Alachua County and Leon County. First rept. on this host in United States. (PDR 38: 796)
MEADOW FOXTAIL (ALOPECURUS PRATENSIS)		
Leaf spot* (Mastigosporium album)	New York	Observed in June 1954 on meadow foxtail growing near Ithaca. Reported on this host in Wales and England, central Europe Scandinavia, Russia and Britain. (PDR 38: 607)
PEARL MILLET (PENNISETUM GLAUCUM)		
Rust* (Puccinia penniseti)	Georgia	Although P. penniseti has not previously been reported in the United States, P. cenchri which has been reported on Pennisetum multiflorum seemed to be a closely related species. (PDR 38: 511)
TIMOTHY (PHLEUM PRATENSE)		
Helminthosporium dictyoides var. phlei, J. H. Graham	Pennsylvania and other northern States	J. H. Graham. (Phytopath. 45: 227)
CHRYSANTHEMUM		
Ringspot** (Virus)	Alabama	A newly recognized pathogen found in combination with chrysanthemum stunt virus. (PDR 39: 33)
CINERARIA (SENECIO CRUENTUS)		
Chlorosis and dieback** (Thielaviopsis basicola)	Maryland	Found in the University of Maryland greenhouses. (PDR 38: 354)

Table 2. (Continued).

Host Disease (Cause)	Where found	Remarks
GERBERA (G. JAMESONII)		
Chlorosis and dieback** (Thielaviopsis basicola)	Maryland	Found in the University of Maryland greenhouses. (PDR 38: 354)
HOLLY (ILEX AQUIFOLIUM)		
Phytophthora leaf and twig blight (Phytophthora sp.)	Oregon Washington	A new Phytophthora disease known for many years but not previously described. This disease is of major importance in Oregon. The pathogen is a new species of Phytophthora related to the P. syringae group. (PDR 38: 723)
CHINESE HOLLY (ILEX CORNUTA)		
Spot anthracnose (Sphaceloma sp.)	Louisiana	A new disease of holly. The trees on which the disease was first observed were grown from seed that came from a tree in Baton Rouge. Although the disease was later found in this tree, it seems unlikely that the disease was transmitted by means of seed. (PDR 39: 243)
HYDRANGEA (H. MACROPHYLLA)		
Aster yellows** (Virus)	Oregon	A single plant of the florist's hydrangea var. Charm was received from Oregon in May 1954. This is believed to be the first record of aster yellows in hydrangea or in the family Saxifragaceae. (PDR 38: 739)
JASMINE (JASMINUM SPP.)		
Galls (Phoma sp. probably a new sp.)	Texas	Fungus galls were readily induced on winter jasmine, on large-leafed privet and on small-leafed jasmine, by wounding and spray inoculation. (PDR 38: 564)

Table 2. (Continued)

Host Disease (Cause)	Where found	Remarks
LIPPIA CANESCENS		
Crown gall** (Agrobacterium tumefaciens)	Arizona	Since the first specimens were found in June, 1953, the disease has been found in 3 plantings near Phoenix and one near Tucson. (PDR 39: 425)
NARICISSUS SP.		
Bacterial streak	Washington	An unusual collapse of Naricissus stems was observed in a commercial field in the spring of 1954. About 2 percent of the plants were infected in a stock that had not been dug for 2 years. (Phytopath. 44: 489)
PANSY (VIOLA TRICOLOR)		
Aster yellows** (Virus)	Maryland	Found on the grounds of the Plant Industry Station at Beltsville. This is believed to be the first record of occurrence of this virus in pansy or in the family Violaceae. (PDR 38: 739)
PICK-A-BACK (TOLMIEA MENZIESII)		
Powdery mildew** Sphaerotheca sp.	Oregon	All of 100 plants in one Portland greenhouse were found to have their older leaves covered with brown perithecia of a powdery mildew. Seemed to fall within the range of S. mors-uvae. (PDR 39: 334)
SALPIGLOSSIS SINUATA		
Powdery mildew** (Erysiphe cichoracearum)	Michigan	Species formerly used extensively as a garden ornamental. Experimental material obtained from Univ. Michigan. (PDR 38: 563)
SCINDAPSUS (S. AUREUS)		
Root rot* (Thielaviopsis basicola	Maryland	From a greenhouse in Frederick, Maryland several specimens of scindapsus were received which had lost almost all roots due to rot. (PDR 38: 354)

Table 2. (Continued)

Host Disease (Cause)	Where found	Remarks
ZINNIA VERTICILLATA Z. PAUCIFLORA Powdery mildew** (Erysiphe cichoracearum)	Michigan	These two host species are not grown horticulturally in the United States. Seeds of these species were sent to this country from Sweden. (PDR 38: 563)
CASTORBEAN (RICINUS COMMUNIS) Stem gall disease** (Synchytrium sp.)	Texas	Observed on the variety Cimarron in a commercial nursery at Cameron. Main symptoms found on the stems, petioles and leaf blades of small seedling plants as small red galls. (PDR 38: 728)
Charcoal rot* (Sclerotium bataticola)	Texas Florida South Carolina Virginia Maryland	The organism compared favorably with previous descriptions of S. bataticola ssp. typica, and was infectious on bean, and sesame as well as castorbean. (PDR 39: 233)
AMERICAN ELM (ULMUS AMERICANA) Root rot** (Thielaviopsis basicola)	Maryland	The presence of T. basicola in 100 percent of the infected roots sampled was verified by isolating the organism on carrots. (Phytopath. 45: 55)
INDIA-HAWTHORN (RHAPHIOLEPIS INDICA) Leaf spot* (Entomosporium maculatum)	California	During the spring of 1954 this serious leaf spot disease was found in several nurseries in the San Francisco Bay area. (Phytopath. 45: 55)
YEDDO-HAWTHORN (RHAPHIOLEPIS UMBELLATA var. INTEGERRIMA) Leaf spot** (Entomosporium maculatum)	California	This host found to be much more resistant to the leaf spot than R. indica. (Phytopath. 45: 55)

Table 2. (Continued)

HOST Disease (Cause)	Where found	Remarks
RED MULBERRY (MORUS RUBRA)		
Twig blight and canker** (Fusarium lateritium)	Mississippi	Distribution as well as the means by which it spreads is not known. It has not been observed to kill trees. (PDR 39: 657)
SCOTCH LABURNUM (LABURNUM ALPINUM)		
Laburnum vein-mosiac (proposed name)	Maryland	Inoculations from leaves of L. alpinum produced reactions of a ringspot type in tobacco, cucumber, snapdragon and bean. The virus thus detected proved to be a mild strain of the tobacco ringspot virus, similar to mild strains common in gladiolus. Laburnum vein-mosaic is suggested for disease from which tobacco ringspot virus was isolated but no evidence is available that this virus causes the Laburnum vein-mosaic. (PDR 38: 740)
RED ALDER (ALNUS GLUTINOSA)		
Valsaria megalospora*	Oregon	Found in 1952 in Clackamas County. This is a distinctive bark fungus. It has been found in Europe. (PDR 39: 334)
YELLOW-POPLAR (LIRIODENDRON TULIPIFERA)		
Dieback	Mississippi	Apparently a new disease found on the Tallahatchie Experimental Forest. An unidentified fungus has been consistently isolated. (PDR 38: 786)

Table 2. (Continued)

Host Disease (Cause)	Where found	Remarks
CARROT (DAUCUS CAROTA)		
Black mold** (Thielaviopsis basicola)	California	As a test carrots were shipped from Calif., to New York in polyethylene bags. The fungus was able to develop on this host because of the combination of high humidity within the bags and the high temperature at which they were stored. (PDR 38: 855)
ONION (ALLIUM CEPA)		
Mottled brown streaking (Xanthomonas striaformans Thomas & Weinhold)	Colorado	Since 1948 Sweet Spanish onions in the Arkansas Valley of Colorado have been affected by a mottled brown streaking of the older leaves and leaf sheaths which develop at temperatures exceeding 75° F. (Jour. Colo-Wyo., Acad. Sci. 4: 23, 1955)
TOMATO (LYCOPERSICON ESCULENTUM)		
Leaf spot (Stemphylium floridanum Hannon & Weber)	Florida	This fungus is similar to gray leaf spot caused by S. solani. Experiments indicate that the fungus is pathogenic on a number of tomato varieties, pepper, wild soda apple and possibly gladiolus. (Phytopath. 45: 11)
Puffball* (Tylostoma berteroanum)	Texas	Found on tomato seedlings growing in rotting cow manure. They matured and dispersed their spores in Sept., and Oct., Seemed to be a hot weather fungus. Common in Argentina. (PDR 39: 656)

DISEASES OF CEREAL CROPS

J. G. Moseman and others reported trends in disease losses of wheat, oats, and barley in North Carolina from 1950 to 1954. More than 800,000 acres of these cereals were harvested annually in North Carolina during the last decade. Wheat, oats and barley yielded 22, 37.5 and 34 bushels per acre, respectively, in 1954. The reduction in potential yield of these three grains in the State from various diseases was estimated for each of the last five growing seasons. Although the loss estimates may be somehwat inaccurate, the year to year trends for the various diseases were thought to be significant. (PDR 38: 887).

Occurrence and importance of small grain diseases in Georgia in 1953-54 was reported by J. H. Miller and others. (PDR 39: 17).

Notes on diseases of cereals and ornamentals recorded in West Virginia during 1953 and 1954 were reported by E. S. Elliott. (PDR 39: 332).

In Wisconsin, the effectiveness of certain antibiotics for the control of seed-borne diseases of small grains was reported by Leben and others. (Phytopath. 44: 704).

G. W. Bruehl and H. Toko reported a Washington strain of the cereal yellow dwarf virus. In California both the apple grain aphid (Rhopalosiphum fitchii) and the English grain aphid (Macrosiphum granarum) are efficient vectors. The apple grain aphid was also effective in Washington, but a single trial indicated that the English grain aphid may be a poor vector of the Washington strain. (PDR 39: 547).

Three virus diseases, wheat streak mosaic, barley false stripe, and barley yellow dwarf have been definitely established as affecting small grains in Wyoming. (PDR 38: 836).

AVENA SATIVA. OATS: Puccinia coronata avenae, crown rust. M. D. Simons reported that in investigations by the U. S. Department of Agriculture and Iowa Agricultural Experiment Station, Ames, using a new set of 10 differential oat varieties, 18 physiologic races of crown rust were identified among collections obtained in 1953 from the United States and Canada. Of these race 202 was predominant followed by races 203 and 213. Race 241 was more prevalent than in previous years. Ninety-one percent of the races attacked Bond, representing a decline in number, and 25 percent attacked Victoria. (PDR 38: 649). M. D. Simons and others reported methods used for reestablishing pure lines of some of the badly mixed differential oat varieties for identification of crown rust races. (PDR 39: 23)

Robert W. Earhart reported the effect of certain seed treatments on stand, yield and seedling blight in Sunland oats in the South. Increases in stand resulting from seed treatment ranged from 5 to 84 percent, with no significant advantage for either Ceresan M or Panogen. Increases in yield ranged from 7 percent at Gainesville to 133 percent at Tifton. All treatments increased emergence and seven of them significantly reduced infection by Helminthosporium. Pentrete, MEMA, Ceresan M, BB/LML/20, and Panogen, in the order named were most effective in the latter respect. (PDR 38: 760). Injury caused by seed treatment of wheat and oats and the gains from seed treatment was discussed by Koehler and Bever. (PDR 38: 762). M. D. Simons reported that two isolates of race 263 of crown rust of oats have been identified from material obtained from Manitoba, Canada. This race vigorously parasitized the varieties Landhafer, Sante Fe, Trisperina, and Bondvic. Ukraine and Victoria were resistant and offered possible sources of resistance. The Avena strigosa varieties, Saia and Glabrota, were highly resistant. (PDR 38: 505).

Puccinia graminis avenae, stem rust. Stem rust resistance in oats induced by nuclear radiation was reported by C. F. Konzak. (Jour. Agron. 46: 538).

Septoria avenae. In tests reported by M. D. Huffman, several oat selections proved to be more resistant than the common commercial varieties to S. avenae.

Seed treatment tests on oats for smut (Ustilago avenae and U. kolleri) 1953-54, see under Triticum aestivum, Tilletia.

Infection by oat smut (U. avenae and U. kolleri) at the different stations in Maryland, Virginia, Minnesota and Washington ranged from 8.1 to 29.2 percent in plants from untreated seed, and from 0 to 3.6 from treated seed. Out of 13 treatments, nine reduced the average infection to less than 0.6 percent. (R. W. Leukel, PDR 38: 755).

Blue dwarf and red leaf (virus). W. H. Sill and others reported that for several years blue dwarf and red leaf have been seen in Kansas oat fields. During the past four years the complex was more prevalent in 1951 and 1954. In 1954 it was present as scattered plants in most fields examined throughout the oat growing area and in a few fields possibly 5 percent or more of the plants were affected. In general losses have been slight but potentially this disease complex must be considered a threat to oat production in Kansas. (PDR 38: 695).

HORDEUM VULGARE. BARLEY: According to G. W. Bruehl early barleys yielded less and appeared to suffer more from root rot (Pythium arrhenomanes) than did adapted varieties of medium to late maturity. (Phytopath. 45: 97).

Ustilago nuda, loose smut, according to T. T. Hebert, can be effectively controlled by holding soaked seed in air-tight containers. The length of anaerobic treatment necessary is inversely related to temperature. Control of smut was obtained when containers were only half filled with soaked seed. A soaking period of only 2 hours in water gave control. (PDR 39: 20). V. F. Tapke reported physiological races in U. nuda, and techniques for their study. (Phytopath. 45: 73).

Stripe mosaic virus has been found in most States in the upper Mississippi Valley. In North Dakota over 90 percent of the fields examined were infected. Rod row trials indicated that the virus can cause severe yield reductions. "Resistance" to one strain of the virus was found in a few barley varieties. Limited studies indicated that this resistance can be transferred to other varieties. (Timian and Sisler. (PDR 39: 550)

SORGHUM SPP. SORGHUM: Harris and Luttrell summarized results of seed treatment tests and reported occurrence of diseases of grain sorghum in Georgia in 1954. (PDR 39: 329).

In 1954 seed-treatment tests for the control of covered kernel smut (Sphacelotheca sorghi) on sorghum were conducted at Beltsville, Maryland, Lincoln, Nebraska, and Ft. Collins, Colorado, and reported by Leukel, Webster and Porter. (PDR 38: 769).

TRITICUM AESTIVUM. WHEAT: Overland and Nelson reported the results of germination tests with treated winter and spring wheat seed at the Washington Agricultural Experiment Station, Pullman. Results indicated that fungicides should be tested more thoroughly before new methods of application are recommended. Copper carbonate slurry, assumed to be non-toxic like the corresponding dust treatment, proved injurious, particularly at low temperatures. (PDR 38: 25).

Cercosporella herpotrichoides, Cercosporella foot rot, was isolated from Cornell 595 winter wheat in Tompkins County, New York, in 1953 and reported from 25 counties in the State in 1954, according to Shoemaker and Tyler. (PDR 38: 710).

Erysiphe graminis tritici, powdery mildew. The influence of temperature on the development of powdery mildew on spring wheats was reported by Futrell and Dickson. The development of this organism was studied on 15 susceptible, intermediate, or resistant spring wheat varieties grown in the greenhouse at 16°, 20°, 24°, and 28 C. These 15 varieties showed a wide range in disease response when grown at the three lower temperatures. The resistant Hope variety showed a wider range of response than any of the other varieties. (Phytopath. 44: 247). D. A. Ray and others reported the inheritance of resistance to powdery mildew of wheat. (Jour. Agron. 46: 379). Allard and Shands reported inheritance of resistance to stem rust (Puccinia graminis tritici) and powdery mildew in cytologically stable spring wheats derived from Triticum timopheevi. (Phytopath. 44: 266).

Michael G. Boosalis reported that the recent increase in the infestation of wheat by Phytophaga destructor (Hessian fly) in Nebraska was shown to be correlated with a corresponding rise in the incidence of crown and basal stem rot, associated predominantly with Helminthosporium and Fusarium spp. The syndrome of Hessian fly-infested plants with crown rot was similar to that of plants damaged solely by parasitic fungi. (Phytopath. 44: 224).

The widespread occurrence of dryland root rot of winter wheat in eastern New Mexico in 1954 was caused by environmental conditions conducive to the disease development, susceptibility of all commercial varieties grown in the area, and abundance of root rot organisms in the soil. The following fungi were isolated from affected samples: Helminthosporium sativum, Rhizoctonia solani, Curvularia spp., and Fusarium spp. (PDR 39: 373).

Polymyxa graminis has been found widespread in wheat fields infested with the soil-borne wheat mosaic virus in Illinois, Virginia, Iowa, Kansas, and Oklahoma. The fungus developed well in pot cultures of wheat and spelt growing in sand or soil at temperatures between 60° and 65° F. There was no evidence that P. graminis can function as a virus vector or as a reservoir host. (PDR 38: 711).

Puccinia graminis tritici, stem rust, and P. rubigo-vera tritici, leaf rust. Acti-dione was the most promising of several antibiotics tested in the greenhouse and the field for control of stem rust (P. graminis f. sp. tritici), according to V. R. Wallen. (PDR 39: 124).

Pady and Johnston reported that spores of stem rust and leaf rust (P. rubigo-vera f. sp. tritici) were carried into Kansas in large numbers in the early part of the 1954 crop season. The minor epidemic that resulted was checked by hot dry weather which caused considerable

crop injury itself. There was good evidence, also, that conditions were favorable during September for a southward movement of stem rust that resulted in local outbreaks in volunteer wheat and moreover may have assisted in providing viable inoculum for the areas in southern Texas and Mexico where the rust overwinters. (PDR 39: 463). Twenty-eight physiologic races of wheat leaf rust were identified at the Kansas and Minnesota Experiment Stations, in cooperation with the U. S. Department of Agriculture, among 248 collections received from 26 States in 1953. Race 5 was the most prevalent in all the States, followed by races 15 and 105. Races 35 and 122 both increased in prevalence, particularly in Kansas and Texas; they attack most of the differential varieties and some other varieties with known resistance to other races. Race 58 was most abundant around the Great Lakes, along the southern Atlantic coast, and around the Gulf coast, race 93 in the Southeast, and race 11 in the Pacific Coast States. Race 9 continued to decline. (PDR 38: 647). Collections of leaf rust of wheat were received from 33 States in 1954. The data obtained from the study of 1143 isolates obtained from these collections showed the presence of 37 races of leaf rust in the United States in 1954. These races are listed by Johnston and Levine. (PDR 39: 463).

Tilletia sp., dwarf bunt. According to Pilgrim and Waldee, fall-sown wheat plants sprayed with Bordeaux mixture or dusted with Ceresan and lime 6 weeks after emergence from the soil had a lower percentage of bunted plants than did the untreated controls. The same fungicides applied to the plants 3 months after emergence had little or no effect on the incidence of dwarf bunt. (PDR 38: 750). S. G. Fushtey reported results indicating that proper seed treatment may aid control of dwarf bunt in spite of soil infestation. (PDR 39: 378). In cross inoculations reported by J. P. Meiners, wheat was infected by dwarf bunt from tall oatgrass (Arrhenatherum elatius) and intermediate wheatgrass (Agropyron intermedium). (PDR 39: 161).

Tilletia caries and T. foetida, common bunt of winter wheat in the Pacific Northwest is transmitted from one crop to the next by seed-borne and soil-borne spores. Control of infection due to seed-borne spores was possible by seed treatment. Certain mercury and copper fungicides have been used for this purpose in the Pacific Northwest for many years. These materials, however, are not effective against infection by soil-borne spores. Hence, there has been a long-felt need for a chemical which, when applied to the seed, will control bunt originating from both seed-borne and soil-borne spores. Holton and Purdy presented the results of tests with several chemical preparations which indicated that a product now commercially available under the brand name "Anticarie" would give satisfactory control. (PDR 38: 753). R. W. Leukel reported seed-treatment tests on winter and spring wheat and oats for smut control, 1953-54. At four stations all the materials eliminated bunt. At Pullman, Washington, with 80 percent bunt in the check, nine materials allowed from 0.2 to 3 percent infection. Five of these were mercurials. Only one material appeared to be harmful to the seed. The mercurials were more effective in checking seedling blight than were the five non-mercurials. (PDR 38: 755).

Ustilago tritici, loose smut. T. D. Persons reported a destructive outbreak of loose smut in a 40-acre wheat field in Jones County, Georgia, with a probable total loss of grain. (PDR 38: 422). In Minnesota, H. W. Schroeder reported the reaction of spring wheat varieties and selections to artificial inoculation with loose smut. (PDR 38: 882).

Mosaic Viruses.

The barley stripe-mosaic is seed-borne in wheat, according to experimental results reported by McNeal and Afanasiev. There was no apparent correlation between percentage of disease in the field and observed germination in the greenhouse. (PDR 39: 460).

Fellows and Sill reported a method of predicting wheat streak mosaic epiphytotics. For severe yield reduction to occur, field infection by wheat streak mosaic virus must take place in winter wheat in the fall, although symptoms are seldom seen until spring. Since the virus is not inactivated in the plant by low temperatures, a fall-infected plant retains virus through the winter. Dormant plants, therefore, may be transplanted to a warm greenhouse (70-80° F) during fall and winter where symptoms gradually develop in diseased plants. For 4 years random samples of winter wheat were gathered at approximately 10-mile intervals in the areas to be surveyed. Locations of positive and negative samples were charted on a map. (Phytopath. 44: 487).

W. H. Sill and others reported that the two important virus diseases of wheat in Kansas again caused heavy losses in the 1953-54 season. The soil-borne wheat mosaic was prevalent in hundreds of fields in most of the counties in the eastern third of the State. Losses from this disease averaged about 26 percent in the diseased spots checked in the 1953-54 season, as compared with average losses of 10 percent in diseased areas in 1951-52. The State loss for 1953-54 season was estimated at $3,000,000, compared with $1,500,000 in 1951-52. Wheat streak

mosaic virus was the major disease of wheat in Kansas in 1954 and was a major factor, along with the early drought and extreme soil blowing, contributing to yield reduction. The State loss caused by streak mosaic was estimated at $14,000,000, which makes the 1954 season second only to the severe 1949 outbreak when there was an estimated $30,000,000 loss. (PDR 39: 29). Sill and others reported that Kansas experiments in a wind tunnel indicated that a small amount of transmission of the wheat streak-mosaic virus may occur during strong winds because of direct abrasive leaf contact between diseased and healthy wheat plants. Soil particles in the wind did not increase the percentage of transmissions. Grazing and trampling by livestock and movements of machinery did not increase transmission in the field. Further evidence was obtained that Aceria tulipae is an important vector. (PDR 38: 445). S. M. Pady reported catching the mite vector (Aceria tulipae) of wheat streak mosaic on slides exposed in the air during June and July 1954 (PDR 39: 296).

ZEA MAYS. CORN: In Iowa, A. L. Hooker described a corn nursery employed for simultaneous evaluations for resistance to several disease and insect pests, and reported some of the findings in 1953 and 1954. (PDR 39: 381).

Benjamin Koehler reported positive correlation between resistance to Stewart's disease (Bacterium stewartii) and northern leaf blight (Helminthosporium turcicum) in corn (PDR 39: 164). The general occurrence of Stewart's bacterial wilt of sweet corn in New York during 1954 provided an opportunity to conduct tests on the control of this disease by streptomycin applied as a foliar spray. Although the sprays failed to exert any apparent therapeutic efforts against established infections, the treatments did provide some protection against new infections. (J. J. Natti, PDR 39: 386). C. W. Boothroyd and others reported results of a 1954 survey for stalk rot in New York. In isolations made from diseased stalks collected on the different farms, Gibberella zeae was recovered most consistently. G. fujikuroi was the next most common fungus recovered. No one factor or combination of factors could be found directly responsible for the severity of the disease. (PDR 39: 380).

Helminthosporium turcicum, crown rot. According to Cox and Wolf in the spring of 1954 a wilt disease was noted in several plots of Iowa inbred lines growing in the sweet corn disease nursery located at Pahokee, Florida. Later, several other inbred lines and hybrids became affected. (Phytopath. 45: 291).

Sclerophthora macrospora, downy mildew. Whitehead reported that a 100 percent infection with downy mildew of a 10-acre, creek bottom field of Texas Hybrid 30 corn was observed in August 1954 at De Leon, in north-central Texas. This field in past years has produced 100 to 125 bushels of corn per acre, but was completely destroyed by this disease in 1954. (PDR 38: 896).

Corn stunt (virus). According to Hildebrand the corn stunt virus disease has been reported in only the two States California and Texas. However, the leafhopper vector, Baldulus maidis, is more widely distributed than the disease, having been found in Arizona, Florida, and North Carolina also. It was found that B. maidis breeds prolifically and completes a generation in about three weeks. Some generations were as short as 18 days; others as long as 24 days. (PDR 38: 572).

DISEASES OF FORAGE AND COVER CROPS

D. A. Roberts and others reported diseases of forage crops in New York in 1954. Ninety meadows and pastures were inspected during the summer and when practicable the extent of crop losses caused by plant disease was estimated. (PDR 39: 316). Forage plant diseases observed in West Virginia during 1954 were reported by E. S. Elliott. (PDR 39: 318).

A foliage disease referred to as "aerial blight" or "summer blight" has been observed on a number of economic and wild plants in Louisiana in recent years and has caused considerable damage to some forage and hay crops in the State according to W. H. Stroube. The causal organism has been identified as Pellicularia filamentosa f. sasakii. Plants on which natural infection of the organism has been found in Louisiana are listed, also plants successfully inoculated. (PDR 38: 789).

GRASSES

In Rhode Island a survey of golf course greens was reported by Troll and Tarjan disclosing widespread occurrence of root parasitic nematodes associated with diseased patches. The authors called attention to the falsity of the view that nematodes are of only slight importance in "colder climates." (PDR 38: 342).

J. P. Meiners reported that snow mold of turf in the Pacific Northwest was associated with

either or both of two organisms: Fusarium nivale and Typhula itoana. Epidemiology depended upon certain weather conditions and varied with the particular organism involved. He gave the results of 3 years' testing of a number of fungicides for snow mold control on golf greens. (Phytopath. 45: 59).

M. A. Manzelli reported that field work initiated in 1953 and continued through 1954 has shown that O-2, 4 dichlorophenyl O, O-diethyl phosphorothioate is capable of controlling parasitic nematodes attacking turf and lawn grasses. Applied as a drench or spray, or injected into the soil at rates of 125, 250 and 500 pounds of technical grade material per acre, it has succeeded in reducing the populations of the pathogenic nematodes sufficiently to permit the grasses to regain their former vigor and growth. (PDR 39: 400).

J. R. Hardison reported some new grass host records and new data on the life history of dwarf bunt (Tilletia brevifaciens), in eastern Oregon. Spore balls of dwarf bunt were found in seed samples of Agropyron trichophorum, Festuca arundinacea, F. rubra, F. ovina var. duriuscula, and Poa pratensis, indicating the spread of infection to additional grass hosts in the area in 1952. The maximum tolerance now specified for all seed classes of susceptible varieties at field inspection is 0.5 percent infection. (PDR 38: 345).

AGROPYRON SPP. WHEATGRASS: In teliospore morphology and host range a form of Puccinia coronata, crown rust, observed on Agropyron in North Dakota resembled f. sp. secalis more than f. sp. avenae, according to E. A. Schwinghamer. Observations on spore morphology and limited pathogenicity studies with the uredial stage were made with a Fargo collection of this rust. The pathogenicity of this isolate on seedlings of some cereal and grass hosts is given in a table. The tribes Avenae, Festuceae and Agrostideae were characterized by immunity, while relative susceptibility was general in the tribe Hordeae that were sampled except members of the genus Triticum. (PDR 39: 345).

AGROSTIS SP. BENTGRASS: Association of nematodes with yellow tuft of bentgrass in Rhode Island was reported by A. C. Tarjan and others. (PDR 39: 185).

BROMUS SPP. BROMEGRASS: In Pennsylvania, Carnahan and Graham reported results of a search for sources of resistance in Bromus to the brown leaf spot fungus (Pyrenophora bromi). The moderately resistant tetraploid, B. sibiricus, appeared to be the only source of resistance for possible breeding material in the Bromopsis section. (PDR 38: 302).

DESCHAMPSIA. HAIRGRASS: Tilletia cerebrina parasitizes grasses in this genus, mainly in the western parts of the United States, Alaska and eastern Canada; it is also widely distributed in Europe. W. N. Siang described the characteristics and nuclear cytology of spore germination in T. cerebrina. (Mycologia 46: 238).

PENNISETUM GLAUCUM. PEARL MILLET: Diseases of pearl millet in Georgia were reported by E. S. Luttrell. In this review of the diseases of pearl millet it was stated that the most common leaf spots are those caused by Helminthosporium stenospilum and H. sacchari, occuring chiefly in the Coastal Plain, and Cercospora penniseti, most serious in the Piedmont. Diseases reported in other areas but not yet found in Georgia were listed. (PDR 38: 507).

LEGUMES

Brinkerhoff and others discussed the effects of chemical seed treatments on nodulation of legumes; they used soybeans, peanuts and cowpeas in their tests. Phygon, Spergon, and Arasan tended to reduce or in some instances nearly eliminate nodulation in non-infested soil when soybeans and cowpeas were grown from treated, inoculated seed. No evidence was obtained that the addition of nodule inoculum to the seed decreased the protective value of the seed treatment chemicals. Nodulation was not appreciably affected by seed treatments in naturally infested soil. (PDR 38: 393).

John W. Baxter reported diseases affecting forage legumes in Iowa in 1954. (PDR 39: 239).

Marmor medicaginis, alfalfa mosaic. In the 1954 plant disease survey for New Mexico, Leyendecker reported that alfalfa mosaic was positively identified as occurring on Trifolium repens, Melilotus officinalis and Medicago sativa. (PDR 38: 893).

CASSIA TORA. SENNA: Tobacco etch virus. C. W. Anderson reported that plants of C. tora are susceptible to systemic invasion by strains of tobacco etch virus and have been found infected under field conditions. The importance of Cassia as a source of etch virus in the

field is undetermined. Observations and an earlier report by Brooks suggest that field infection may be fairly common in Florida. In north-central Florida, Cassia plants do oversummer the virus but cannot overwinter it as they die. Evidence indicates that farther south Cassia plants may survive the winter and prove a year-round source of etch virus. (PDR 38: 736).

GLYCINE MAX. SOYBEAN: Kilpatrick and Hartwig discussed as factors affecting fungus infection of soybean seeds, planting date and stink bug injury. (PDR 39: 174, 177).

John Dunleavy reported soybean diseases in Iowa in 1954. (PDR 39: 169).

Incidence of soybean diseases in the Delta area of Mississippi in 1954 was reported by R. A. Kilpatrick. In general, fungus diseases were more prevalent than bacterial diseases. Observations on harvested seed showed only a small amount of purple stain (Cercospora kikuchii) in the fall of 1954, although the leaf bronzing stage of the disease had been prevalent earlier. (PDR 39: 578).

Diaporthe phaseolorum var. sojae, pod and stem blight fungus, was found associated with root and basal stem rot of soybean in four Illinois fields. In May 1954, soybean stems were collected from the soil of a field in which soybeans were last grown in 1951. The possibility was suggested that the pod and stem blight organism surviving on old soybean stems in the soil may infect the base of the plant, remain semi-dormant during the growing season and then spread throughout the plant as it matures. (J. W. Gerdemann). (PDR 38: 742).

LUPINUS SPP. LUPINE: Harvey W. Rankin reported that the treatment of lupine seed with Spergon under the environmental conditions pertaining to the Georgia Coastal Plain region reduced nodulation, growth, and nitrogen fixation to a marked degree. It does not follow that this would always take place whenever legume seed are treated with Spergon. Because of the susceptibility of lupine to a number of soil-borne diseases, it was recommended that the crop be planted not more than once in a 3-year rotation. It was found difficult to maintain a high population of Rhizobium bacteria in sandy soils under these conditions. (PDR 38: 744).

Microsphaera diffusa, powdery mildew, of lupines has so far been observed in greenhouses, but studies reported by Luttrell and Samples indicated that given a source of inoculum it could cause damage to blue lupines in the field late in the season. (PDR 38: 719).

MEDICAGO SATIVA. ALFALFA: Colladonus montanus in Washington occasionally attains high population densities on alfalfa. This species has been found on most varieties of stone fruit trees. H. R. Wolfe considers that this species is not an economic vector of the western X-disease virus comparable to C. geminatus or Scaphytopius acutus, and in controlled experiments it is less efficient than the rare but efficacious Fieberiella florii. (PDR 39: 298).

Phytophthora cryptogea, root rot. Donald C. Erwin has given the first expanded account of this Phytophthora root rot on alfalfa. The disease was found in 5 counties in California. (Phytopath. 44: 700).

Pratylenchus sp., meadow nematodes, were found in large numbers in roots of alfalfa that had been sown in winter wheat in the spring in Kentucky. As many as 104,500 nematodes and eggs per gm. of fresh roots were found in 2-month-old seedlings. Root damage was extensive and severe, and stand was severely reduced. After summer fallow, fall-sown alfalfa plants of similar size in the same plot had approximately 1/1000 as many Pratylenchus as spring-sown plants. Root injury was slight and stand was good. (Phytopath. 44: 542).

POA SPP. BLUEGRASS: In Nebraska, W. W. Ray reported that the lawn of Merion bluegrass reported heavily infected with rust (Puccinia graminis) in 1953 contained only a trace of rust in 1954. However, in Lincoln, another large lawn seeded to Merion bluegrass in the fall of 1952, and which had some rust in 1953, was severely infected with rust in 1954. (PDR 39: 408).

TRIFOLIUM PRATENSE. RED CLOVER: F. W. Poos and others reported investigations indicating that the clover root borer (Hylastinus obscurans) can spread both northern (Kabatiella caulivora) and southern (Colletotrichum trifolii) anthracnoses of red clover. (PDR 39: 183).

In Illinois, J. W. Gerdemann reported the pathogenicity of Leptodiscus terrestris on red clover and other Leguminosae. It has also been reported from roots of diseased alfalfa in Virginia. (Phytopath. 44: 451).

Kilpatrick and others reported the relative pathogenicity of fungi associated with root rot of red clover in Wisconsin. They found that many of the fungi concerned were also pathogenic to the crop in the seedling stage, the most virulent being three isolates of Pythium debaryanum,

one strain each of Pythium sp., Fusarium oxysporum, F. solani, and F. "roseum", and the one isolate of the black patch fungus (sterile fungus)tested. Moderate damage was caused by some isolates of Rhizoctonia, Phoma, and Gliocladium roseum. (Phytopath. 44: 292).

TRIFOLIUM REPENS. WHITE CLOVER: K. H. Garren in Alabama reported on disease development and seasonal succession of pathogens of white clover. This report has been presented in two parts to emphasize the ecological nature of the sequential relationships among societies of fungi pathogenic on white clover. Part I (PDR 38: 579) established the general background of the study, gave details on procedure, and presented a discussion of the fungi attacking leaf tissue. Part II has taken up stolon diseases and the damage-growth cycle. (PDR 39: 339).

TRIFOLIUM REPENS VAR. LADINO. LADINO CLOVER: Webb and Schultz reported a virus causing phyllody of Ladino clover in Maine and discussed its possible connection with potato purple-top wilt. This is the first report of phyllody in Ladino clover in the eastern potato-growing areas. Phyllody may indicate the appearance of a strain of the aster yellows virus complex new to the northern Maine potato area. (PDR 39: 300).

VICIA VILLOSA. HAIRY VETCH: Pratylenchus penetrans. Jensen and others described a technique for examining soil diffusion patterns of nematocides. (PDR 38: 680).

VIGNA SINENSIS. COWPEA: Cowpea seed treatment did not seem to be useful in Mississippi according to results of tests reported by W. W. Hare. (PDR 39: 580).

VIGNA SINENSIS AND CROTALARIA: Virus diseases: C. W. Anderson reported studies on viruses of Vigna and Crotalaria, in three parts. (PDR 39: 345, 346, 349, 354).

DISEASES OF FRUIT CROPS

Estimated loss from diseases of fruits and vegetables in Tennessee in 1954 was reported by J. O. Andes. (PDR 39: 280).

CITRUS SPP. CITRUS: Hendersonula toruloidea was shown to be a wound-invading pathogen capable of causing dieback and cankers on grapefruit trees in southern California. The fungus occurs frequently, but not consistently, in association with lesions of the Rio Grande gummosis type on grapefruit in the Salton Basin. Except under certain adverse environmental conditions, control measures for the fungus on Citrus species are unnecessary. (E. C. Calavan and J. M. Wallace. Phytopath. 44: 635).

Penicillium spp., mold. C. N. Roistacher and others reported good protection of citrus fruits from decay due to P. digitatum, green mold, and P. italicum, blue mold, in California with ammonia gas. (PDR 39: 202).

Pythium aphanidermatum, damping-off, has been reported by DeWolfe and others as the cause of seed bed damping-off of citrus in California. (PDR 38: 632).

The burrowing nematode, Radopholus similis, has been determined to be the cause of "spreading decline", a serious condition affecting citrus trees in Florida. W. A. Feder and J. Feldmesser have presented studies on the life history of this nematode. (PDR 39: 395). Nine additional hosts, six of which are weeds in citrus groves, of the burrowing nematode in Florida were reported by Troy L. Brooks. (PDR 39: 309).

Citrus tristeza virus was shown by graft transmission experiments to infect 17 satsuma orange varieties (C. reticulata) on various rootstocks and Meyer lemon tops grown on trifoliate orange (Poncirus trifoliata) in a variety collection near Winter Haven, Texas. Satsuma trees over 20 years old on certain citrange stocks still lived and bore fruit though infected with the virus, thus confirming previous findings that some citranges are tolerant. (Olson and McDonald. PDR 38: 439).

FICUS CARICA. FIG: Pellicularia koleroga, thread-blight, according to Tims and others, is the most important disease of figs in Louisiana. During the summer partial defoliation of many trees occurs in the southern part of the State, and if the fruit is then still immature it fails to ripen. There is often little permanent damage to the affected trees. One or two applications of tribasic copper sulfate in late May or early June usually give satisfactory control of the disease until after the fruit ripened in July. They listed 34 other plants, including tung,

Aleurites fordii, attacked by thread blight in the State. (PDR 38: 634).

FRAGARIA SPP. STRAWBERRY: Phytophthora fragariae, red stele, was reported by Goheen as one of the most serious diseases of the strawberry throughout the Temperate Zones. In susceptible strawberry varieties, the disease may spread rapidly and soon render the entire planting worthless. Studies were reported that demonstrated that fall-dug strawberry plants without macroscopic symptoms may carry the red stele fungus. (PDR 39: 141).

Sphaerotheca macularis (= S. humuli), powdery mildew, occasionally becomes a major disease of strawberries in the Pacific Coast States and is often serious in England. Under screenhouse conditions which seemed most favorable to severe powdery mildew infection, 41 strawberry varieties were rated for infection. Eleven varieties were free of mildew and 8 others very resistant. Some others were very susceptible. Under field conditions, slightly less injury was observed than in the screenhouse. (G. M. Darrow and others. PDR 38: 864).

Virus diseases.

Darrow, Goheen and Miller reviewed the status of strawberry virus diseases in the United States, and outlined the importance of these diseases in commercial strawberry production, and the measures being taken to combat them. (Proc. Amer. Soc. Hort. Sci. 63: 547). A. C. Goheen described a method for determining the success of graft unions between plants in strawberry virus studies. (PDR 39: 31). According to Marcus and Darrow, intergrafting virus-free plants of eight strawberry varieties produced no virus symptoms. Virus-free stock of any two or more of the eight varieties can be grown in adjacent rows or fields and no harmful effect of one variety on another may be expected even though vector aphids are numerous. (PDR 38: 607).

P. W. Miller reported that the strawberry aphid (Pentatrichopus fragaefolii) will transmit strawberry viruses from detached strawberry leaves in petri dishes to indicator plants of Fragaria vesca. Non-persistent viruses are readily transmitted but persistent viruses are usually not recovered by this technique, probably because aphids cannot survive on the detached leaves for periods of time sufficient to acquire the persistent viruses. It was pointed out that this technique cannot be used to certify plants as virus-free because the persistent viruses are not detected. (PDR 38: 568). P. W. Miller also reported inactivation of non-persistent viruses in strawberry plants by hot-air treatment. (PDR 38: 827). Norman W. Frazier discussed sources and effects of infection of strawberry plants by the tobacco necrosis virus. (PDR 39: 143).

George M. Darrow reviewed the history of leaf variegation of strawberry. The evidence so far is that variegation is not due to a virus for after many trials by several workers it has not been transmitted. Apparently it is due to a frequently mutating or unstable gene and the tendency to mutate is inherited as a recessive. (PDR 39: 363).

MALUS SYLVESTRIS. APPLE: Erwinia amylovora, fire blight. Virulent cultures of this organism were isolated at the University of Missouri, from Jonathan apples picked in February 1954, from trees which had been severely diseased during the previous spring and summer. It was concluded that the bacterium may overwinter in diseased fruits in Missouri and Arkansas, where "hold-over cankers" are rarely observed. (R. N. Goodman. PDR 38: 414). Extremely good control of fire blight with antibiotics under epidemic conditions was reported by R. S. Kirby in Pennsylvania. Two bloom sprays of Agrimycin a streptomycin-Terramycin conbination, applied in the regular schedule reduced the average number of infections per tree on Opalescent and Gravenstein to 0.92, compared with 88.5 for pheno-lead from petal fall to second cover and 106.5 for the regular schedule. Spread of infection down the spurs and into the branches was arrested in Agrimycin-sprayed trees, though pronounced in those receiving other treatments. (PDR 38: 432). Control of apple fireblight with sprays of Agrimycin, in Missouri was reported by R. N. Goodman. (PDR 38: 874). C. N. Clayton reported that five streptomycin formulations were compared for control of fire blight of apple trees in North Carolina in 1954. Streptomycin sulfate plus Terramycin, soluble streptomycin sulfate, and streptomycin nitrate were effective. (PDR 39: 128).

Podosphaera leucotricha, powdery mildew. In 1953 and 1954 powdery mildew of apple was very destructive in many orchards in Northwest Arkansas. Orchards of the Jonathan variety, which predominates, were most severely damaged. Circumstances that appeared to be at least partially responsible were the drought in Northwest Arkansas during the latter part of 1953 and into the growing season of 1954 and the elimination of the 1953 apple crop, for all practical purposes, by spring frosts, which resulted in greatly curtailing or eliminating regular spray programs. (PDR 38: 607). Antibiotics were included among the materials compared by Louis Beraha and others for control of apple powdery mildew. (PDR 39: 132).

PERSEA AMERICANA. AVOCADO: In California R. D. Raabe and G. A. Zentmeyer reported that in view of the extreme susceptibility of the rootstocks tested and because of the lack of an effective eradicant fungicide, land with a known history of Dematophora necatrix should be avoided when planning new avocado orchards. (PDR 39: 509).

T. W. Young described a technique for collecting migratory endo-parasitic nematodes (Radopholus similis, Pratylenchus sp.) from avocado roots, which was more efficient and more rapid than the Baerman funnel technique. He stated that with modification it could perhaps be adapted to other crops. (PDR 38: 794)

PONCIRUS TRIFOLIATA. TRIFOLIATE ORANGE: Tylenchulus semipenetrans, citrus nematode. Previous studies have shown that the common species of Citrus were susceptible to the citrus nematode, whereas the trifoliate orange was markedly resistant. James W. Cameron and others reported that in their study young seedling populations of Poncirus from 3 sources all showed a high degree of nematode resistance. Hybrid seedling populations were obtained from crosses between Poncirus and 5 Citrus species. These populations likewise all showed resistance, whereas accompaying nucellar seedlings of Citrus were usually susceptible. (Phytopath. 44: 456).

PRUNUS spp. Viruses: Brase and Parker described a decline of Stanley prune trees on Myrobalan rootstock (Prunus cerasifera) affected with chlorotic fleck. (PDR 39: 358).

Immunity to necrotic ring spot was not found in any of 122 species of Prunus tested, representing all botanical sections of the genus, and it was concluded that the probability of the occurrence of immunity to this disease within the genus is slight. The possibility that necrotic ring spot virus is an essential component of the sour cherry yellows complex was discussed. (R. M. Gilmer, PDR 39: 194).

Lambert mottle virosis. Afanasiev and Morris reported that a virus disease that closely resembles Lambert mottle is the most important virus disease of cherry in Montana. Positive transmission was obtained by bud inoculation. The disease is found only on Lambert and Peerless varieties of sweet cherry. Infected trees in the orchards were found in groups, which indicated that transfer of virus takes place from one tree to the next rather than over great distances. This disease has caused definite economic losses in the orchards since very often infected trees died in 3 years. (Phytopath. 44: 481)

X-disease virus. Experiments indicated that Colladonus clitellarius, though relatively uncommon, is partially responsible for field transmission of the virus in New York. The leafhopper appears to prefer Prunus spp., particularly chokecherry and plum, though it has been observed on a number of other plants. (PDR 38: 628).

PRUNUS AMYGDALUS. ALMOND: Cladosporium sp., scab, has during the past few years caused some economic loss in the almond orchards of certain areas in California. (J. M. Ogawa and others. PDR 39: 504)

The conidial stage of a powdery mildew, apparently Sphaerotheca pannosa, on an unknown variety of almond at the Tree Fruit Experiment Station at Wenatchee, Washington was brought to the attention of Roderick Sprague in June. Powdery mildew on almond seems to be uncommon, since no other reports from the United States were found. (PDR 38: 695).

PRUNUS ARMENIACA. APRICOT: Ring pox (virus). Cochran and Stout discussed the distribution, symptoms, transmission, control of, varietal reaction to, and effect of environmental factors on ring pox, with particular reference to southern California. (Bull. Calif. Agr. Exp. Sta., 42: 7-10.).

PRUNUS PERSICA. PEACH: Cladosporium carpophilum, scab. D. H. Petersen and J. C. Dunegan reported factors influencing the control of peach scab in South Carolina. (PDR 39: 134).

Diplodina persicae, storage rot. During July 1953 a decay of Elberta peaches in a commercial shipment from South Carolina was found to be caused by D. persicae, according to W. R. Wright and others. It was suggested that prompt precooling of the fruit and shipment under standard refrigeration should control the decay during transit. (PDR 38: 436).

Monilinia fructicola, brown rot. Post-harvest treatments for the reduction of peach decays was reported by W. L. Smith and others. (Phytopath. 44: 390). J. M. Ogawa and others reported that spray preparations containing captan, one of the carbamate compounds, or wettable sulfur, appeared to afford good protection to peach fruit against infection by the brown-rot fungus in central California. (PDR 38: 869). In tests reported by Alcorn and Ark in California candicidin

as a fruit dip proved to be an excellent protectant against peach brown rot. (PDR 39: 210).

Xanthomonas pruni, bacterial spot cankers. Survival of this organism until late winter in summer cankers in South Carolina was reported by H. H. Foster and D. H. Petersen. (PDR 38: 783).

Apple mosaic (virus). H. C. Kirkpatrick in Washington reported results indicating that peach is susceptible to apple mosaic virus, that it may carry this virus under greenhouse conditions, and that mild symptoms may develop in the first flush of growth. It seemed possible that apple mosaic could exist and be overlooked in orchard peach trees. (Phytopath. 45: 292).

Phony peach virus. Millikan and Anderson summarized results of 24 years' phony peach eradication in Missouri. The results indicated that the spread of the phony peach virus can be economically controlled. All counties but one have been removed from the quarantine list and the low annual infection rate emphasized the value of the eradication program. (PDR 38: 834).

Wart (virus). In 1952 severe infection by peach wart virus was observed on several Candoka trees near Farmington, New Mexico. The disease, believed to have been introduced into the area on these trees as nursery stock, has for the past 15 years been confined to them without affecting adjacent trees of known susceptible varieties, indicating that no vector of the virus is present in the area. (J. E. Chilton, PDR 38: 329).

X-disease virus. H. H. Thornberry gave a preliminary report on insect transmission of eastern peach X-disease in Illinois. Transmission of the disease from infected chokecherry to peach was effected by a mass collection of insects, including Colladonus clitellarius, from an area where the chokecherry carried the disease. Individuals of C. clitellarius confined to diseased peach foliage died soon afterwards. This might explain the non-transmission of the virus from peach in nature although it can be carried from chokecherry to chokecherry and peach. The vector probably survives on peach long enough to transmit the virus but not to acquire it and then migrate to a healthy plant. (PDR 38: 412).

In Washington, the western X-disease virus remained active in stored peach budwood for a longer time than it was thought to do, according to tests reported by Cheney and Reeves. (PDR 29: 543).

PYRUS COMMUNIS. PEAR: Erwinia amylovora, fire blight. Tests have indicated that antibiotic sprays are highly effective in controlling blight on the extremely blight-susceptible Forelle variety in Oregon in 1954. (J. R. Kienholz, PDR 39: 208). In 1954, at Marysville, California, Bartlett pears were treated against blight with streptomycin-Terramycin mixtures. The results indicated that the streptomycin-Terramycin mixture applied as a spray was highly effective in pear blight control without causing the severe russet that often follows the use of copper sprays or dusts. (PDR 38: 666).

Fall application of boron sprays as a control for blossom blast and twig dieback of pears in Washington was reported by Folke Johnson and others. (Phytopath. 45: 110).

RUBUS spp. BLACKBERRY AND RASPBERRY: Pratylenchus spp., meadow nematodes. Some limited observations on occurrence of meadow nematodes on various blackberry and raspberry species and varieties were summarized by Austin C. Goheen. The surveys indicated that meadow nematodes were widespread on cultivated brambles in Maryland and North Carolina. In some cases these nematodes were found in very large numbers. Nematodes may be an important factor in the decline of some cultivated brambles in eastern North America. (PDR 38: 340).

RUBUS PROCERUS. HIMALAYA BLACKBERRY: A mosaic disease, was ultimately fatal to Himalaya blackberry. The causal agent was transmissible by grafting to red raspberry and to peach. It appeared not to be transmitted through Himalaya seed. Symptoms in peach indicated a relation to yellow bud mosaic of peach. (S. M. Alcorn and others. Phytopath. 45: 272)

VACCINIUM spp. BLUEBERRY: Botrytis cinerea, blossom and twig blight. Pelletier and Hilborn reported that considerable crop losses of low-bush blueberries, chiefly V. angustifolium and V. canadense, but also V. corymbosum, occur in Maine through the blossom and twig blight. Laboratory experiments showed the temperature range for the growth of the fungus to be between 5° and 32° C, with an optimum at 23°. The optimum for conidial germination was 8° to 29°. In 1953 vancide ZW gave field control almost equal to fermate. (Bull. Maine Agr. Exp. Sta. 529, 28 pp). Pseudomonas sp., bacterial canker, has frequently caused severe losses in cultivated blueberries in Oregon, according to Vaughan and Boller, particularly on six varieties. In 1953-54 Bordeaux mixture and three other fungicides were applied to randomized repli-

cated plots in October and November. The results confirmed the effectiveness of Bordeaux mixture and indicated that other copper materials can also be used for control of the disease. (PDR 38: 867).

VITIS spp. GRAPE: John M. Harvey reported a method of forecasting decay in California storage grapes. Fumigation of California table grapes with sulfur dioxide surface-sterilized them and thereby reduced losses from decay in storage, but did not eliminate decay because the gas did not kill the fungi that had already gained entrance into berries before harvest. Most of the decay in stored grapes, in fact, resulted from incipient infections not evident at harvest. (Phytopath. 45: 229).

In California the use of protective fungicides in the field as an adjunct to post-harvest sulfur dioxide fumigation has significantly reduced decay in stored Emperor grapes. Captan, B-622, and Crag 5400 significantly reduced decay due to Botrytis cinerea in years when the organism was a major cause in grape decay. (J. M. Harvey. Phytopath. 45: 137).

Nematodes (Meloidogyne spp. and Pratylenchus spp.) probably are important in hampering establishment of grape replants in declining vineyards in California, according to D. J. Raski, who reported results of trials with soil fumigation. (PDR 38: 811).

In California, D. J. Delp reported the effect of temperature and humidity on the grape powdery mildew (Uncinula necator). (Phytopath. 44: 615).

Virus diseases.

Hall and Hewitt reported no success with a color reaction test to identify virus diseases of grapevines. (PDR 39: 150).

According to Freitag and Frazier tests were conducted to determine the percentage of leaf hopper vectors of Pierce's disease virus of grape that were carrying the virus under natural conditions in a number of different habitats. In these tests particular emphasis was placed on the three economically important vectors; the green sharpshooter, Draeculacephala minerva; the redheaded sharpshooter, Carneocephala fulgida; and the blue-green sharpshooter, Hordnia circellata. The results suggested that generally Pierce's disease virus occured naturally wherever the three important vectors were found. Naturally infected leafhoppers occurred in widely different habitats in California such as the seashore, the high mountains, the desert, and the cultivated valleys. (Phytopath. 44: 7).

DISEASES OF NUT CROPS

P. W. Miller summarized incidence of nut diseases in Oregon in 1954. (PDR 39: 68).

CARYA ILLLINOENSIS. PECAN: Cladosporium effusum, scab. R. H. Converse reported results of preliminary trials using eradicant sprays for pecan scab control. The disease is still very difficult to control in epiphytotic years, and the cost of protectant spraying is a considerable item in pecan production. At the end of the season when the trials were completed monocalcium arsenite was the only eradicant that gave significantly better results than the control. (PDR 38: 701).

DISEASES OF ORNAMENTAL AND MISCELLANEOUS PLANTS

R. A. Young discussed the serious and far-reaching results of the dissemination of plant diseases in nursery stock, including ornamental plants and fruit trees, with particular reference to observations made in Oregon. (PDR 38: 417).

Notes on diseases of cereals and ornamentals observed in West Virginia during 1953 and 1954 were recorded by E. S. Elliott. (PDR 39: 332).

Keller and Potter reported that Thielaviopsis root rot (T. basicola) has been observed in Maryland affecting several greenhouse ornamentals, including poinsettia (Euphorbia pulcherrima) which were severely damaged, cyclamen, begonia, Scindapus aureus, cineraria, and Gerba jamesonii, and also elm seedlings obtained from Wisconsin. (PDR 38: 354).

CALADIUM BICOLOR. CALADIUM: About 20 percent of a shipment of caladium tubers imported into California from Florida were found to have a soft rot similar to that caused by Erwinia carotovora. The entire shipment was returned. Isolations from these infected areas yielded a species of Botrytis which appeared to be B. ricini. (Segall and Fortuño, PDR 39: 283).

CAMELLIA spp. CAMELLIA: Sclerotinia camelliae, flower blight. N. N. Winstead and others reported that a survey carried out from 1951 to 1954, inclusive, showed that camellia flower blight, Sclerotinia camelliae, was present on 18 properties in four counties of North Carolina. The fungus was believed to have been introduced into most of these places one or two seasons prior to discovery. (PDR 38: 670). Gill and Ridley reported camellia flower blight from Augusta, Georgia, where it has probably been present in private gardens for several years. (PDR 38: 673).

Sclerotinia sclerotiorum, flower blight. In North Carolina Winstead and Haasis reported that S. sclerotiorum was capable of causing a flower blight of camellia similar to that caused by S. camelliae. Its importance as a cause of flower blight is not known. (Phytopath. 44: 717).

According to E. M. Hildebrand, during a survey carried out in 1952-54, of the diseases of ornamental plants in the Houston area of Texas, unsuitable soil and unsatisfactory drainage and irrigation were found to be mainly responsible for the death rate of camellias. Variegation, much of which is believed to be due to virus infection, was next in importance. (PDR 38: 566).

CHRYSANTHEMUM spp. CHRYSANTHEMUM: R. S. Robinson and others reported results indicating that streptomycin and oxytetracycline can be used to control bacterial wilt (Erwinia chrysanthemi). Streptomycin was more effective than oxytetracycline, for it provided protection at lower concentrations and was less toxic. (Phytopath. 44: 646).

Virus diseases.

Brierley and others reported that tomato aspermy virus, known in the United States since 1951, has been found to cause blight injury to flowers of some chrysanthemum varieties. Experimental inoculation resulted in infection in 38 species of 30 genera and 12 plant families and failed in 38 other species. They also named the aphids that have transmitted the disease. Vector relations of aspermy virus are discussed in relation to field spread, which is thus far unreported in the United States. (PDR 39: 152).

DAHLIA sp. DAHLIA: Spotted wilt (virus). A clone of the dahlia variety Rhythm, all plants of which were severely affected by spotted-wilt disease, was transformed into a healthy stock of plants by the rooting of small stem-tip cuttings. Several other dahlia varieties were similarly freed from this disease. Apparently the causative virus does not move freely toward the growing tips of dahlia plants but lags behind the growth of the stem. Recovered stocks remained free of disease when grown in the absence of a source of reinfection. (F. O. Holmes. Phytopath. 45: 224).

DIANTHUS CARYOPHYLLUS. CARNATION: W. D. Thomas reported that of five varieties tested at the Colorado Agricultural and Mechanical College for reaction to Pseudomonas caryophylli, Durango appeared to be immune and without any tendency to carry the pathogen in a masked form. White Sim and Skyline were semi-resistant and might serve as carriers, while Arapahoe and Miller's Yellow were susceptible and could not be considered as symptomless carriers. (Phytopath. 44: 713).

GLADIOLUS spp. GLADIOLUS: In this article on Botrytis diseases of gladiolus in the United States, originally prepared for the Gladiolus Disease Symposium sponsored by the North American Commercial Growers at Cleveland in 1953, the author (C. J. Gould) reviewed the existing literature, citing some 83 titles, and including some unpublished data. The effects of relative humidity, temperature, and other factors on the gladiolus corm during storage were discussed in relation to disease control. (PDR Suppl. 224, 33 pp.).

Fusarium brown rot, Fusarium oxysporum f. gladioli, has been reported to be destroying annually 50,000,000 gladiolus corms over an area of 8,000 acres in Florida. Control measures in the field have included replacement every third or fourth year with the healthiest corms from planting stocks, growing cover crops in two out of three years, and using resistant varieties. In storage the best control was obtained by soaking corms for 10 to 15 minutes in Dowicide B. (Seed World 75: 16, 1954).

Pseudomonas marginata, scab. Control of bacterial scab by various insecticides used as corm and soil treatments alone or together with fungicides was reported by J. L. Forsberg. (PDR 39: 106).

Frank A. Haasis reported that a sanitizing treatment of a Ceresan-M dip applied shortly after corm harvest effectively reduced storage loss in gladiolus caused by Stromatinia gladioli, without jeopardizing subsequent growth. (PDR 38: 518).

Virus diseases.

Early in 1954 the nursery inspectors desired a further survey for gladiolus viruses in Oregon to obtain data for their cleanup program. For an effective cleanup program roguing of all plants showing white streak and western aster yellows is absolutely necessary. At the same time plants with severe cucumber mosaic virus and ringspot virus should be pulled out. The fact that so little white streak was found as compared to other years indicates that the cleanup program already shows results. The gladiolus industry in Oregon in 1953 included 429 acres. (J. L. Heinis, PDR 38: 733). Evidence indicating aphid transmission of tobacco ringspot virus was reported by Smith and Brierley. (PDR 39: 35).

HELENIUM HOOPESII. SNEEZEWEED: A new rust host, Puccinia conspicua on H. hoopesii, for the hyperparasite Cladosporium aecidiicola was reported by P. D. Keener. This is one of the few reports for this species of Cladosporium in the United States. Also associated with the same rust was Tuberculina persicina, which was present in the same rust sori with C. aecidiicola or in different sori. (PDR 38: 690).

HYDRANGEA MACROPHYLLA. HYDRANGEA: Philip Brierley at the Plant Industry Station, Beltsville, Maryland reported symptoms in the florist's Hydrangea caused by tomato ring spot virus and an unidentified sap-transmissible virus. (Phytopath. 44: 696).

ILEX GLABRA. GALLBERRY: J. H. Owen reported fasciation of roots of gallberry in Florida. Fasciation of aerial parts of plants is of common occurrence, but a search of the literature failed to reveal any information concerning fasciation of subterranean roots. (PDR 39: 242).

IRIS spp. IRIS: At the Plant Quarantine Branch, San Francisco, California, Leptosphaeria heterospora was frequently identified on iris rhizomes imported from abroad. Observations suggested that the fungus may occur in several localities in central and northern California on both native and introduced plants. It is probably of little or no consequence as a parasite (P. R. Frink, PDR 38: 674).

Sclerotium rolfsii, crown rot. C. J. Gould reported that crown rot of bulbous iris is world wide in distribution. Although most serious in warmer climates it has caused considerable damage in western Washington in certain years. Soaking infected bulbs for 3 hours in a warm (110° F) solution of formalin (0.5%) has given practical control in both experimental and commercial tests. This treatment should be supplemented by sufficient rotation, careful culling, and other sanitation practices. (Phytopath. 44: 711).

LILIUM LONGIFLORUM. EASTER LILY: Rosette (virus). Easter lilies of the Croft variety with symptoms suggestive of lily rosette were brought from West Virginia in March 1954. The vector of lily rosette virus, Aphis gossypii, was present on the lilies when received. The grower stated that 150 of 800 plants developed rosette and were unsalable. (Brierley and Smith, PDR 38: 739).

PELARGONIUM HORTORUM. GERANIUM: Xanthomonas pelargonii, bacterial stem and leaf spot, according to D. E. Munnecke, has severely limited the production of cuttings from field-grown geraniums in California for several years. No commercial variety of P. hortorum was found to be immune from the stem rot phase, but several varieties were resistant to the leaf spot stage of the disease. Infected cuttings serve as inoculum for adjacent healthy cuttings in the rooting bed. Field control measures must be based upon established disease-free planting stock, using 1-year rotated fields, and following strict sanitary measures. (Phytopath. 44: 627).

POTHOS AUREUS: In the spring of 1954 a severe epiphytotic broke out in a commercial greenhouse establishment in Missouri specializing in the sale and propagation of Pothos aureus, a popular variegated houseplant. Losses of 30 percent were commonly experienced, serious enough to make the profitable growing of the crop questionable. A Rhizoctonia sp. consistently was found associated with the disease. The use of sterilized soil apparently will control the disease. (Millikan and Smith, PDR 39: 240).

ZINNIA ELEGANS. ZINNIA: Sclerotium rolfsii, southern blight. In the 1954 survey for New Mexico, Leyendecker reported that southern blight was found to be responsible for a 25 to 30 percent loss of mature plants in a commercial seed field of zinnia at Garfield, New Mexico. The damage followed heavy rains where runoff water stood in low areas of the field. (PDR 38: 894).

DISEASES OF SHRUBS AND TREES

Diseases and insects affecting shade trees and ornamental shrubs commonly planted in Georgia are listed by Miller, Campbell and Thompson. The senior author has been observing ornamental plants in Georgia for more than thirty years. This period covered several noteworthy droughts (1925-26 and 1931-33) as well as other unusual climatic disturbances such as the severe freeze of November 27, 1951. In addition to these damaging climatic variants many diseases and insects new to this region have been introduced during this period. (PDR 38: 362).

The rose black mold fungus (Chalaropsis thielavioides) caused severe losses of evergreen grafting stock in a New Jersey nursery, according to Hess and Welch. The fungus has been identified as causing graft failure of Cryptomeria japonica, Ilex opaca, Juniperus virginiana, Thuja orientalis, and T. occidentalis. The probable source of the inoculum was understock of Cryptomeria japonica. (PDR 38: 415).

Davidson and Campbell reported that during routine studies Poria cocos was isolated from a variety of hosts from most of the important timber areas of the United States. A list of new hosts was given. (Mycologia 46: 234).

ACER spp. MAPLE: Phyllosticta leaf spot P. minima, was epidemic on maples in northwestern Pennsylvania in the spring of 1954, according to C. L. Fergus. The disease was severe on red maple (A. rubrum), but less so on hard maple (A. saccharum). (PDR 38: 678).

ACER NEGUNDO. BOXELDER: E. R. Toole reported that Fusarium negundinis is consistently associated with red stain of boxelder in the Mississippi Delta. (PDR 39: 66).

CASTANEA DENTATA. CHESTNUT: Endothia parasitica, chestnut blight. Fifty years of chestnut blight in America is reported by Beattie and Diller. They give a brief review of the history, distribution, and spread in the United States over the last 50 years of chestnut blight, control investigations, and breeding for resistance. It was stated that between 1947 and 1954 the Division of Forest Pathology established in 11 eastern States 13 hybrid test plots each with 50 specimens of Clapper's, Graves', and Chinese hybrids. The last mentioned was the most promising and was recommended for small-block plantings; it should furnish within a decade a source of seed for further afforestation with chestnut in other areas. (Jour. For. 52: 323).

CHAMAECYPARIS LAWSONIANA. LAWSON CYPRESS: Phytophthora cinnamomi, root rot. Dewayne Torgeson reported that the tree root rot in Oregon, caused by P. cinnamomi, has also been found attacking Chamaecyparis lawsoniana vars. allumi and elwoodi, English yew (Taxus baccata), Japanese yew (T. cuspidata), Erica carnea, and Calluna vulgaris vars. alba and aurea in both nurseries and home plantings. He pointed out that the ease with which the pathogen is disseminated, its wide host range, and the lack of any practical means of control may result in P. cinnamomi becoming serious in Oregon. (Contr. Boyce Thompson Inst., 17, 6, pp. 359-373).

FRAXINUS spp. ASH: Puccinia peridermiospora, rust, appeared in epiphytotic form in Massachusetts, extending from the coast to about 30 miles inward. (D. P. Limber, PDR 38: 696).

LIQUIDAMBAR STYRACIFLUA. SWEETGUM: A southwide survey for sweetgum blight was reported by G. H. Hepting. Throughout the South, although sweetgum blight was common, it had not caused excessive mortality. Only 1 percent of all sweetgums tallied were dead, and only 1 percent of the Maryland sweetgums were dead. (PDR 39: 261). George Y. Young reported the progress of sweetgum blight in Maryland plots, 1952-1954. (PDR 39: 266). Investigations of possible causes of sweetgum blight were reported by F. H. Berry. He pointed out that many of the symptoms of the blight are characteristic of a systemic virus disease, however, his results were inconclusive. (PDR 39: 270).

PINUS ECHINATA. SHORTLEAF PINE: E. R. Roth reported the spread and intensification of the little leaf disease of shortleaf pine, associated with soil type and the presence of Phytophthora cinnamomi in southeastern United States. (Journ. For 52: 592).

PINUS PONDEROSA. PONDEROSA PINE: Cronartium coleosporioides, western gall rust, caused considerable damage to ponderosa pine in western Montana. This outbreak appeared to have started 15 to 20 years ago and was still active, judging by the ages of living rust galls which

ranged from 1 to 15 years. (C. D. Leaphart, PDR 39: 314).

PINUS STROBUS. WHITE PINE: Henry I. Baldwin reported widespread occurrence of needle blight on eastern white pine in New Hampshire this year. He concurred with earlier investigators that the trouble is related to drought injury in the preceding years. Affected trees were found on all types of soil and under different conditions of moisture, exposure and shade. The most severe symptoms were found predominantly in young trees on exposed dry sites. The injury was limited to white pine. (PDR 38: 725).

PLATANUS spp. SYCAMORE: Gnomonia veneta, anthracnose, was very severe throughout Illinois during the latter half of May 1954, resulting in partial to complete defoliation of trees of all sizes within one to two weeks from the first appearance of the disease. Trees in rural areas or in large parks in urban areas were more severely affected than those of comparable size in typical town areas, and large trees more than small ones. (G. H. Boewe and others. PDR 38: 597). Fungicide tests in 1954 for the control of sycamore anthracnose were reported by Schneider and Campana in Illinois. (PDR 39: 64).

QUERCUS spp. OAK: Endoconidiophora fagacearum, oak wilt. E. B. Himelick and others reported tests on insect transmission of oak wilt in Illinois. They concluded that infection is not likely to result until a spring temperature has been reached that will promote both germination of the spores and continued growth of the fungus. (PDR 38: 588). According to Griswold and Bart in Ohio early in 1954, transmission tests were made with adults of Pseudopityophthorus pruinosus which were introduced into cages with test seedlings that had recently broken dormancy. Two cases of oak wilt fungus transmission resulted from these early 1954 tests. This successful transmission in the laboratory suggests that this bark beetle may be able to transmit the fungus in a similar manner to healthy oaks in the field. (PDR 38: 591). W. J. Stambaugh and others reported effects of temperature upon development of perithecia in vitro. (PDR 38: 592). In Pennsylvania the following reports were made on insect transmission: (1) Spores adhered to the external surfaces of nitidulid bodies, according to Yount and others, (2) Thompson described experiments with spore-infested insects caged on wounded healthy trees, (3) Morris and others used radioactive iodine for tagging experimental insects. (PDR 39: 54, 58, 61). Long distance transmission of the fungus in Wisconsin depends on occurrence of favorable conditions, according to L. H. McMullen and others. (PDR 39: 51). D. M. Norris, Jr., reported and discussed the results of several studies on the role of wounds in natural overland transmission of E. fagacearum in Iowa. Natural spread occurred in 31 of 122 red oak (Q. borealis) trees which were wounded during the period April 24 to June 22. (PDR 39: 249). In experiments reported by Jones and Bretz oak wilt was not transmitted by tools that had been used on diseased trees. (PDR 39: 498). C. L. Fergus reported the effect of temperature and nutrients upon spore germination in the oak wilt fungus. (Mycologia 46: 435).

Observations reported by J. S. Boyce, Jr. on the development of oak wilt in North Carolina and Tennessee indicated that on wilting trees that were felled and cut into logs during the summer, mycelial mat formation occurred only during autumn of the same year and the mats disintegrated by the following spring, while infected trees that were left standing produced mats in the spring. Since infection occurs mostly in the spring summer felling alone, without further treatment, may reduce the spread of the disease. (PDR 38: 676). Arthur W. Engelhard reported that oak wilt fungus mats and pads have been observed on members of both the red and white oak groups in Iowa. (PDR 39: 254). Early felling of diseased trees reduced mat formation in Pennsylvania tests reported by C. L. Morris. (PDR 39: 258). Merek and Fergus reported that the most significant result of preliminary studies at the Pennsylvania State College on the longevity of E. fagacearum in ten dying red oaks (Q. borealis) felled in 1952 was the maximum periods for successful isolation of the fungus, indicating its ability for survival in different treated materials (Phytopath. 44: 328). In Ohio, according to Spilker and Young the longevity of the fungus in lumber retaining bark was affected by temperature and moisture content. It was short lived in lumber blocks subjected to temperatures of 25° and 27.5° C. When the lumber was stored at lower temperatures, longevity increased. The apparent influence of moisture content on the longevity was such that as the moisture content decreased longevity also decreased. (PDR 39: 429). The oak wilt organism was first reported isolated from all parts of infected trees in 1944 In 1950 Kuntz and Riker pointed out the significance of preexistent natural root grafts between healthy and infected oaks as a means of local spread of the oak wilt disease. Workers in several States have reported longevity of the fungus in roots: Ohio, 9 months; Pennsylvania, 1 year; Wisconsin, 3 years. (W. L. Yount, PDR 39: 256). Aerial surveys carried out during the sum-

mer of 1953 by Federal and State agencies and by private concerns and individuals showed that oak wilt was still confined to the 18 States where it had been reported in previous years, though additional counties were affected within these States (M. E. Fowler, PDR 38: 595).

ULMUS spp. ELM: Ceratostomella ulmi, Dutch elm disease. The 1954 spread of the Dutch elm disease in Illinois was summarized by Campana and Carter. The disease spread extensively into northern and western Illinois and increased in southern and eastern parts of the State during 1954. The number of diseased trees increased so much that an accurate count throughout the State was no longer possible. (PDR 39: 245).

DISEASES OF SPECIAL CROPS

BETA VULGARIS. SUGAR BEET: Curly top (virus). C. L. Schneider reported occurrence of sugar beet curly top in Minnesota and Iowa in 1954, which adds evidence indicating eastward spread of the vector (Circulifer tenellus) and the virus. (PDR 39: 453).

DIGITALIS spp. FOXGLOVE: A small acreage of D. lanata has been grown commercially in Wisconsin since World War II with only minor losses from disease. During 1954, however, two diseases appeared which caused the growers concern. One was Colletotrichum fuscum which was present in every field. The other disease was a severe, malforming mosaic caused by tobacco mosaic virus. Sample counts in the most severely affected field showed over 50 percent of the plants infected. As far as the authors (R. W. Fulton and E. K. Wade) were aware natural occurrence of this virus on D. lanata had not been reported previously. (PDR 39: 284).

GOSSYPIUM spp. COTTON: Bollenbacher and Marsh described a fluorescent-fiber condition in raw cotton, associated with various organisms. Aspergillus flavus was found very regularly on the fluorescent fiber. Aspergillus niger and Rhizopus sp. were also commonly present, while various other organisms were somewhat less frequent. (PDR 38: 375).

GOSSYPIUM spp. COTTON: Fusarium and Verticillium wilt. Epps and others reported that a survey was carried out from 1951 to 1953, inclusive, to determine the damage caused by cotton wilt in 19 cotton-growing counties of western Tennessee, to establish more reliable criteria for wilt loss estimates, and to intensify experiments on disease control. Of every 100 acres inspected averages of 11 to 50 were infected by Fusarium, the incidence varying considerably from year to year, and 5 to 11 by Verticillium. The average annual loss was estimated at 9,209 bales (valued at $1,197,000), 62 percent of which was due to Fusarium and 38 percent to Verticillium. (PDR 38: 304). In a study in Texas, of soil samples taken from different areas of cotton fields where the amount of Verticillium wilt varied widely it was found that the severity of the disease varied inversely with the salt concentration in the soil and sodium in the leaves. (Christensen and others. PDR 38: 309).

Fusarium oxysporum f. vasinfectum. In the Baton Rouge area of Louisiana the development of a high incidence of wilt in the highly susceptible Half and Half cotton variety is dependent on heavy soil infestation by the nematode Rotylenchulus reniformis according to D. C. Neal. (Phytopath. 44: 447).

During the third week of May 1954, young cotton plants were sent from Allendale County, South Carolina to Clemson College for diagnosis. Reddening of the leaves was noticeable in a number of fields in the County. The appearance of the lesions as well as that of the conidiophores and spores corresponded to those described by Tucker for Helminthosporium gossypii. (C. H. Arndt, PDR 38: 728).

Experiments reported by J. R. Brazzel indicated that the pink bollworm, Pectinophora gossypiella, is not an important factor in the incidence of cotton boll rots. (PDR 39: 583).

In Oklahoma, Brinkerhoff and others reported field tests with chemicals for the control of Rhizoctonia solani, responsible for severe seed decay, pre-emergence injury, damping-off, and and sore shin of cotton. (PDR 38: 467). Brinkerhoff, with others, also reported greenhouse tests with chemicals for the control of cotton seedling diseases. (PDR 38: 476).

Thielaviopsis basicola, root rot or "internal collar rot", was observed in cotton growing at the Shafter, California Field Station in the fall of 1953, according to J. T. Presley. The symptoms were typical of those occurring on mature plants. (PDR 38: 529). In the 1954 survey for New Mexico Leyendecker reported that black root rot was discovered in a commercial planting of upland cotton near Berino, New Mexico. Fifty to 60 percent of the plants in two areas

were killed by the disease. The disease had previously been reported from New Mexico on long staple cotton. The organism was associated with nematode galls. (PDR 38: 894).

Verticillium albo-atrum, Verticillium wilt. Staffeldt and Fryxell described a method of estimating reaction of cotton varieties and selections to Verticillium wilt. It was decided that the percentage of infected plants was not adequate in determining the tolerance of cotton to Verticillium wilt under New Mexico conditions. (PDR 39: 690). The presence of Verticillium wilt in cotton was not affected by root knot nematodes (Meloidogyne spp.), according to W. D. McClellan and others. (PDR 39: 226. See also under Fusarium).

In Texas, L. S. Bird reported that genetic-controlled carbohydrate and soluble nitrogen combinations in plant tissues caused resistance to the bacterial blight (Xanthomonas malvacearum) disease of cotton. In greenhouse experiments plants with weak resistance became highly resistant after treatment with ammonium nitrate. (PDR 38: 653).

Leaf crumple (virus). According to R. C. Dickson and others, for the past several years the leaf crumple disease of cotton has been observed in the Coachella and Imperial valleys of southeastern California. The incidence of the disease has increased throughout the summer in many seeded cotton fields. Stub (rattoon) cotton has often shown a high level of infection, sometimes reaching 100 percent by midsummer. Transmission of leaf crumple has been obtained only by grafting and by the transfer of adult white flies from diseased to healthy cotton plants. (Phytopath. 44: 479).

NICOTIANA Spp. TOBACCO: Estimated loss from diseases of tobacco in Tennessee in 1954 was reported by J. O. Andes. (PDR 39: 280).

Peronospora tabacina, blue mold, according to reports to the Plant Disease Warning Service was present in 1954 throughout the Georgia tobacco belt, also in Florida, South Carolina, North Carolina, Virginia, Tennessee, Maryland, Pennsylvania, Connecticut, Massachusetts, and Ontario, Canada. North Carolina experienced the worst outbreak of blue mold in the field during the entire history of the disease in the State. Damage was given as severe where control measures were not used or where fungicidal treatments were discontinued. Person and Garriss reported that it was conservatively estimated that loss of the first priming (sand lug leaves) and in some fields damage to second and third primings, amounted to 4 1/2 to 5 million dollars. (PDR 39: 228).

In Connecticut blue mold is most destructive in seedbeds but frequently also causes important losses of tobacco in shade tents and open fields. No blue mold warnings were issued in 1952 or 1953. However, warnings were issued in 1954. A detailed study of an epiphytotic in an open, commercial field of Broadleaf tobacco in 1954 revealed the manner of spread of the pathogen. (Waggoner and Taylor. PDR 39: 79). Clayton and Grosso reported that zineb-tobacco dust gave relatively poor blue mold control and that the zineb-pyrophyllite dust gave good blue mold control. Applied as a spray, both gave good blue mold control, indicating that the zineb in both mixtures was active fungicidally. It was concluded that the tobacco dust was mechanically a less efficient carrier of the fungicide than the pyrophyllite and to obtain equal blue mold control the zineb-tobacco mixture would need to contain more than two times as much zineb. (PDR 38: 771). In Kentucky, W. D. Valleau suggested that proper plant bed management could lead to eradication of the fungus in the Eastern United States. (PDR 29: 231). A series of greenhouse experiments were conducted at Beltsville, Maryland to test the fungicidal value of various antibiotics in the control of blue mold of tobacco. In one experiment a 0.01 percent aqueous spray of streptomycin sulphate reduced the percentage leaf destruction from 30 (untreated) to 1.8, being second only to Dithane (1.7) and superior to other antibiotics tested. (John J. Grosso. PDR 38: 333).

Phytophthora parasitica var. nicotianae, black shank. H. R. Powers reported studies at the North Carolina State College on the mechanism of wilting in tobacco plants affected with black shank. Results gave no support to the theory that wilting in black shank is a systematic effect of a toxic metabolic product of the fungus. The only explanation possible is that the loss of turgor is due to the blocking of water movement through the lesions. (Phytopath. 44: 513). J. L. Apple reported the preliminary results of an investigation which indicated the existence of pathogenic strains of Phytophthora parasitica var. nicotianae. It appeared that the isolates collected from severe disease locations are among the highly pathogenic group. Thus, it is possible that this is one of the factors involved in many North Carolina fields where moderately resistant tobacco varieties fail to control black shank, especially in those areas where the population of plant parasitic nematodes in very low. (PDR 38: 774). Laboratory, greenhouse and plant bed tests of 7 varieties and strains of flue-cured tobacco in the seedling and transplant stages showed wide ranges in levels of resistance to black shank. Plants of transplant size of both Dixie Bright

101 was as resistant as Dixie Bright 102. In plant bed tests on black-shank infested soil no diseased plants of Dixie Bright 101 or Dixie Bright 102 were seen, whereas, in some plots of the same tests all plants of the 400 variety were killed. (Lucas and Todd. PDR 38: 502). Johnson and Valleau reported on heterothallism in P. parasitica var. nicotianae. Results of their studies suggested the presence in Kentucky of four different strains of the fungus. (Phytopath. 44: 312). Incidence of black shank increased directly with soil pH in Florida experiments reported by R. R. Kincaid and Nathan Gammon. The critical pH for blackshank suggested by field observations in Kentucky was about 5.6. This was higher than that observed in the first year of the Florida experiment, which was 5.2 or lower. (PDR 38: 853). The first known case of blackshank from the Burley tobacco area of southwest Virginia was reported to the Plant Disease Warning Service. (S. B. Fenne).

Pseudomonas tabaci, wildfire. In experiments conducted by the Tobacco Experiment Station, Greeneville, Tennessee and the Field Crops Research Branch, Beltsville, Maryland, four sprays at weekly intervals of streptomycin sulfate gave good control of tobacco wildfire. The antibiotic appeared to be effective both as a protectant and an eradicant and improved the root systems of treated plants. (Heggested and Clayton, PDR 38: 661). Results of Pennsylvania tests with streptomycin preparations for the control of wildfire were reported by R. S. Kirby. (PDR 39: 14). Beach and Engle reported wildfire control by streptomycin nitrate in Pennsylvania. (PDR 39: 15).

An outbreak of Pythium rot in the newly set fluecured tobacco crop in Virginia reached an epiphytotic status during the current transplanting season, according to W. A. Jenkins. The severity of the disease appeared to be due to the unusually wet cold weather which persisted since May 3. Additional contributing factors were mechanical injuries sustained by the seedlings either before or following transplanting. (PDR 38: 421).

In California, Siegel and Wildman reported some natural relationships among strains of tobacco mosaic virus. (Phytopath. 44: 297).

ORYZA SATIVA. RICE: In a survey reported by J. G. Atkins 18 different suspected or known parasitic nematodes were obtained from rice soils in Texas and Louisiana. (PDR 39: 221).

PARTHENIUM ARGENTATUM. GUYULE: Fusarium solani caused wilting of 9-month-old nursery plants of guayule in southwest Texas in 1951, and of 2-year-old non-irrigated plants in 1952 and 1953. So far the disease is of minor importance. In the field, all or only part of the branches wilt. (Don C. Norton, PDR 38: 500).

RICINUS COMMUNIS. CASTOR BEAN: A. A. Cook reported that a species of Pleospora was found on castor bean leaves on three different occasions during the summer of 1954. Mature perithecia of the fungus were found on senescent leaves, twice on the variety Cimarron at Gainesville, Florida, and once on variety U.S. 101 at Plymouth, North Carolina. (PDR 39: 184).

Sclerotium bataticola, charcoal rot, was found on castor bean at College Station, Texas, Blackville, South Carolina, Warsaw, Virginia, Beltsville, Maryland, and Gainesville, Florida in 1954. The causal organism, as isolated from castor bean at Gainesville, compared favorably with previous descriptions of S. bataticola spp. typica, and was infectious on bean and sesame as well as castor bean.

SACCHARUM OFFICINARUM. SUGARCANE: Physalospora tucumanensis, red rot. A yeast identified as Candida intermedia, found associated internally and externally with the sugarcane moth borer and one of its parasites in the adult stage, has been found to be strongly antibiotic against the sugarcane red rot fungus, but not against an associated red rot organism Fusarium moniliforne, commonly found in the Florida Evergaldes. The possibility of using C. intermedia by cultivating it on sterile cane juice or dilute cane molasses for inoculating cane cuttings or for the production of toxin for the control of the red rot due to P. tucumanensis was suggested. (B. A. Bourne. Phytopath. 45: 37).

DISEASES OF VEGETABLE CROPS

Estimated loss from diseases of fruits and vegetables in Tennessee in 1954 was reported by J. O. Andes. (PDR 39: 280).

The use of wild Lycopersicon species for tomato disease control was reported by S. P.

Doolittle. He stated that encouraging results have been obtained. (Phytopath. 44: 409).

Results of vegetable seed treatments in Louisiana were reported by Martin and Atkins. Tests were made during the winter of 1952-53 to study the effectiveness of various newer chemicals recommended for that purpose by the manufacturers. (PDR 38: 348).

J. M. Beal and others described a color test for viruses in plants. (PDR 39: 558).

In the 1954 plant disease survey for New Mexico, Leyendecker reported that curly top Ruga verrucosans) was general over the State causing considerable damage to tomato, red pepper, and beans. Numerous commercial fields suffered from 25 to 50 percent loss because of the disease. (PDR 38: 893).

ALLIUM spp. CHIVES, GARLIC, ONION, SHALLOT: Experiments have demonstrated that several species of Allium and all of the horticultural varieties of Allium cepa tested were susceptible to Puccinia asparagi. Uredia developed on all the horticultural varieties of A. cepa tested, and were followed by telia in most cases. (Louis Beraha, PDR 39: 98).

Penicillium digitatum, Penicillium clove rot, During the 1953-1954 season many garlic plantings in California were heavily infected with Penicillium clove rot. Field examinations in December 1953 showed that from 90 to 95 percent of the planted cloves were infected to some degree. Later field observations in January 1954 indicated that about 5 percent of the young developing plants were severely damaged from the effects of this infection. (E. B. Smalley, Phytopath. 44: 506).

APIUM GRAVEOLENS. CELERY: In New Hampshire severely stunted and chlorotic celery plants with poor root systems were found to be growing in soil heavily infested with nematodes (Paratylenchus hamatus). Cropping the soil for one year with lettuce and spinach reduced the nematode population, and following the cropping system for another year entirely eliminated this nematode. (PDR 39: 307).

Observations on varietal susceptibility of celery to aster yellows virus in California were reported by Yamaguchi and Welch. The results did not necessarily indicate that some of the varieties tested were more resistant to the aster yellows virus than the others. The leafhopper vectors perhaps show varietal preferences in their feeding habits. (PDR 39: 36).

According to Geraldson, investigations at the Gulf Coast Experiment Station, Florida, showed that the black heart disease of celery is due to calcium deficiency in the growing point and may be completely cured by the application of 0.05 to 0.25 M solutions of calcium salts to the affected part. Repeated applications may be necessary to keep the heart supplied with sufficient calcium for healthy growth. (Proc. Amer. Soc. Hort. Sci. 63: 353).

ASPARAGUS OFFICINALIS. ASPARAGUS: Botrytis sp. of the cinerea type, die-back, was first observed in New Hampshire in the fall of 1951. The same type of injury was noted the following fall and again in 1954. Although Botrytis spp. have been reported to cause grey mold of asparagus shoots both in the field and in transit, A. E. Rich stated that he found no previous record of a Botrytis die-back of asparagus occurring in the United States. (PDR 39: 305).

Fusarium oxysporum f. asparagi, Fusarium wilt, was reported as a major factor in the decline and replant problem of asparagus in California by Grogan and Kimble. The fungus occurred to a greater or less degree in all plantings examined. (Phytopath. 44: 490).

BRASSICA OLERACEA var. BOTRYTIS. BROCCOLI, CAULIFLOWER: Corticium solani (Pellicularia filamentosa), black root (damping-off, wire stem) became so serious in western Washington that an economical control of the disease was necessary. Since pentachloronitrobenzene (PCNB) had given outstanding control of club root without injury to the plants, it was tested against the black root disease of cauliflower. Analysis indicated that results of the experiments were highly significant. (Leo Campbell, PDR 38: 859).

BRASSICA OLERACEA var. CAPITATA. CABBAGE: Fusarium oxysporum f. conglutinans, yellows. Tests reported by Robert B. Marlatt showed that some yellows-resistant cabbage varieties can be successfully grown in Arizona. (PDR 39: 414).

Peronospora parasitica, downy mildew. Chloranil (Spergon) gave best control of downy mildew of all the fungicides tested on heading cabbage in South Carolina, reported by W. M. Epps. (PDR 39: 89).

In Mississippi, D. C. Bain reported tests on black rot (Xanthomonas campestris) resistance in cabbage. The results were interpreted as evidence in cabbage of one or more factors for resistance to the fungus. (Phytopath. 44: 331).

CAPSICUM FRUTESCENS. PEPPER: J. L. Apple and D. F. Crossan described an apparently new Pythium stem rot and wilt of pepper observed in North Carolina. (PDR 38: 555).

The manner in which streptomycin controls bacterial spot (Xanthomonas vesicatoria) has been discussed by Crossan and Krupka in Delaware. (PDR 29: 480). For bacterial spot of chilli peppers, see under Lycopersicon esculentum.

CITRULLUS VULGARIS. WATERMELON: Phytophthora parasitica, fruit rot. In June 1954. attention was called to a watermelon fruit rot in an irrigated field in the lower Rio Grande Valley of Texas. The rot was more serious in 1954 than at any previous time. A 15 percent loss was sustained in some fields. (D. C. Norton and D. W. Rosberg. PDR 38: 854).

Sunburn. In Mississippi, G. K. Parris reported that sunburning of watermelon was reduced by the use of lime paste, for which he gave formula and method of application. In tests with the variety Blacklee, where no lime was applied 49 out of 65 melons sunburned, where lime was applied to companion melons in the same field only 15 out of 60 sunburned. (PDR 38: 529).

CUCURBITS. CUCUMBER, MELON, SQUASH: Evidence of seed transmission of the cucumber anthracnose pathogen (Colletotrichum lagenarium) was reported by Horn and Wilson. Transmission of the pathogen through the seed of cucumbers has been suspected for years, but no experimental evidence demonstrating this condition has been recorded in the literature. (Phytopath. 45: 348).

Crossan and others reported that a hitherto undescribed leaf and stem blight of summer squash (Cucurbita pepo var. condensa) occurred periodically in North Carolina. Fruits were also infected. The disease was severe in warm, moist weather and occasionally caused complete loss of some plantings. A fungus identified as Phytophthora capsici was isolated from diseased plants. (PDR 38: 557).

Pseudoperonospora cubensis, downy mildew. In South Carolina, Barnes and Epps reported a "brown lesion" type of resistance in cucumbers to downy mildew, different from the hitherto known "yellow lesion" type. (PDR 38: 620). According to reports to the Plant Disease Warning Service in 1954, downy mildew of cucurbits was found in the Atlantic Coast Seaboard States as far north as Connecticut and also in Arkansas and Texas. The disease seemed to spread in the coastal areas rather than farther inland. In unsprayed fields the damage to the crop was heavy, and severity on cucumbers in Delaware was as high as 50 percent. However, where control measures were applied properly and maintained throughout the season, excellent control was obtained. Nabam plus zinc sulfate was reported as giving best control. Zineb spray or dust also proved very effective.

The reappearance in 1954 of cantaloupe downy mildew in a severe form in the lower Rio Grande Valley of Texas after an apparent absence of three years was due to the unusually wet and humid spring, according to G. H. Godfrey. A comparison of the 1954 data with those of previous years showed a relation between incidence and high early morning relative humidity. The possibility of applying daily weather reports to better advantage in timing fungicidal applications was discussed and a closer cooperation with the Weather Bureau and the Extension Service was advocated. The establishment of a downy mildew spray warning service for the area was recommended. (PDR 38: 616). F. S. Beecher reported experimental results in which certain mixtures of a fixed copper and a dithiocarbamate gave better control of cucurbit downy mildew (P. cubensis) than either material alone. (PDR 39: 220).

Virus diseases.

N. Tomlinson reported that root extracts are more infective and more stable than top extracts from cucumber plants infected with a cherry virus. (PDR 39: 148).

Whitaker and Bohn reported mosaic reaction and geographic origin of about 700 accessions of Cucumis melo. The data indicated that the best sources of resistant plants are China and neighboring Korea, followed by northern India and Pakistan. (PDR 38: 838). Harvesting operations can be a major factor in the spread of mosaic in Oregon cucumber fields, according to Amen and Porter. (PDR 38: 841).

HIBISCUS ESCULENTUS. OKRA: Verticillium wilt, see under SOLANUM MELONGENA.

IPOMOEA BATATAS. SWEETPOTATO: Rhizopus spp., soft rot. Robert Aycock reported that dipping sweetpotato roots in borax solutions of 1% and 2.5% concentration effectively reduced soft rot when they were taken from storage and repacked. Recuring for 48 hours at 85° F with relative humidity 60 percent or above appeared to be as effective as borax treatments. (PDR 39: 409).

Internal cork virus. Harvey W. Rankin reported that development of internal cork symptoms is apparently correlated with size of the roots. (PDR 39: 455). At the North Carolina State College, Raleigh, A. S. Williams reported development of foliage symptoms associated with internal cork of sweetpotato. (Phytopath. 44: 334).

Webb and Hanson reported mechanical and aphid transmission of the feathery mottle virus of sweetpotato. This virus was found in Wisconsin in 1951 and Louisiana in 1952. (Phytopath. 44: 290). Webb also reported some hosts of feathery mottle virus of sweetpotato. (PDR 38: 448).

LACTUCA SATIVA. LETTUCE: Bremia lactucae, downy mildew, according to R. S. Cox, is the primary and frequently sole disease during the winter months in the Florida Everglades. If cool weather persists, as happened in the spring of 1954, the disease may remain a serious problem into March and April. Experimental work showed that zineb adequately controlled downy mildew. (PDR 39: 421).

Erysiphe cichoracearum, powdery mildew. Studies on the epidemiology and host range of this organism in California are reported by J. A. Deslandes. Until recently no mention has been made of powdery mildew as a serious disease of commercial fields of lettuce. (PDR 38: 560).

According to Padhi and Snyder a disease affecting all the lettuce varieties grown in the Colma coastal district of San Mateo County, California, during the past 20 years, especially during the rainy winter season, was characterized by the development on the leaves of brown circular, zonate spots. The causal organism was found to be a form of Stemphylium botryosum, the imperfect stage of Pleospora herbarum. Because of its selective action on lettuce the fungus is designated S. botryosum f. lactucum n. f., the imperfect stage of P. herbarum f. lactucum n. f. (Phytopath. 44: 175).

LACTUCA SATIVA. LETTUCE: Big vein (virus). Although big vein occurs every year in California, especially in the spring crop of the central coastal area where practically 100 percent of the plants in some fields are affected, it usually has not been considered a serious factor in limiting production. Data presented in a table showed that big vein affects yield, but not in a straight-line relationship correlated with percentage infection as is usually true of a disease with a syndrome that renders the lettuce completely unmarketable. Big vein exerts its greatest effect on yield during weak market periods. (F. W. Zink and R. G. Grogan, PDR 38: 844).

Brown spot of head lettuce found on eastern markets is apparently not a specific disease entity but a complex of symptoms, according to B. A. Friedman. The breakdown is probably physiological in nature and may develop in response to a number of different adverse conditions in the field or while the lettuce is in transit or storage. (PDR 38: 847).

Tipburn and rib discoloration. Stewart and Foster reported comparative susceptibility of lettuce varieties to rib discoloration and to tip burn. (PDR 39: 418).

LYCOPERSICON ESCULENTUM. TOMATO: Alternaria tomato, nailhead spot, was found to a damaging extent in the Lower Rio Grande Valley of Texas in the fall of 1953. The disease occurred again in the fall of 1954 but was not quite so severe as in 1953. (Godfrey and Harrison, PDR 39: 185).

Botrytis cinerea, gray mold, and ghost spot have become serious diseases of tomatoes in Florida, according to J. F. Darby. Results of experiments in the greenhouse to reproduce ghost spot were partly successful. Histological studies failed to show that ghost spot was caused by an insect or a fungus; however, the nature of the injury suggested the latter. In fungicide trials conducted over a 3-year period (1951-54) 50% wettable dichlone was the most effective material tested for both diseases. Mixtures of dichlone and zineb were found to be promising in the control of gray mold, ghost spot, and gray leaf spot. (PDR 39: 91).

The occurrence of bacterial canker, Corynebacterium michiganense, on tomato under field conditions in South Carolina was reported to the Plant Disease Warning Service.

In Connecticut, Waggoner and Dimond reported the reduction of water flow by mycelium of Fusarium oxysporum f. lycopersici in wilted tomato plants. (Amer. Jour. Bot. 41: 637).

Heterodera marioni, root knot nematode, Systox used as a soil drench did not give good control of root knot of tomato in experiments reported by Max Fielding. (PDR 38: 807).

According to Hopper and Tarjan, chlorophenyl methyl-rhodanine (N-244), used as a soil drench at the rate of 3 grams per square foot, was found to be an effective eradicant of root knot nematode (Meloidogyne incognita) infection of tomatoes under greenhouse conditions. It was observed that the chemical was toxic to roots of treated plants and also the nematodes con-

tained therein. (PDR 38: 542).

Orobanche ramosa, branched broomrape, has been found troublesome on tomatoes in a few fields in Alameda County, California, according to Stephen Wilhelm. The apparent capacity of the broomrape seed to lie dormant in soils for long periods, and of the parasite to recur in profusion in response to planting a favorable host such as tomato, has been well established by field observations. Spread in California has been accounted for by flood waters and by transportation of seed-infested soil on farm implements. (PDR 38: 890). Wilhelm and Benson reported that special fumigation techniques may be required for eradication of broomrape because the seed is present in the surface layers of the soil. Their data did not indicate that broomrape seed persisted in the surface soil, however, nor that it was resistant to drying since the soil had been plowed and disced within one month of obtaining the samples. (PDR 38: 553).

Phytophthora infestans, late blight. Potato and tomato late blight as reported to the Plant Disease Warning Service occurred in many States and Canada, but its importance in 1954 was limited to localized severe outbreaks. These outbreaks affected tomato in Mississippi, and potato in Aroostock County, Maine, where the epidemic was the most severe in the history of the State. No blight was found in the green-wrap tomato areas of Georgia, the plants as a whole being relatively free from plant diseases this year. This was the first year since 1946 that late blight was not observed in green wrap fields. Its absence was due to above-normal temperatures and below-normal rainfall.

Rich and Richards reported a source of resistance to tomato late blight. Several hundred native and foreign tomato accessions have been screened for resistance to late blight at Durham, New Hampshire during the past few years. A cherry tomato (Lycopersicon esculentum var. cerasifolium) was found to be highly resistant. (Phytopath. 45: 186).

Pythium spp., damping off. According to M. C. Strong, in experiments at the Department of Botany and Plant Pathology, Michigan State College, on the control of damping-off of tomato seedlings, all the fungicides tested except manzate were effective both as soil treatments and dusts. Dusting was recommended in preference to soil treatment because it is easier, requires less fungicide, and the abundant hairs on the tomato seed retain the fungicide well. (Bull. Michigan Agr. Exp. Sta. 36: 285. 1954).

Sclerotium rolfsii, southern blight. Soil treatment tests with chlorobromopropene for the control of southern blight of tomato in Texas was reported by P. A. Young. He suggested that further tests should be made with this material to determine a method of commercial use. (PDR 38: 858).

David Gottlieb and others described a new antifungal agent, filipin, produced by an undescribed streptomycete. The incidence of gray leaf spot, Stemphylium solani, of tomatoes was reduced 25 percent under treatment when the plants were artificially infected in the greenhouse. (PDR 39: 219).

Xanthomonas vesicatoria, bacterial spot, has been serious for many years on tomatoes and peppers in the vegetable growing areas along the lower east coast of Florida. Seedlings for autumn and winter crops are particularly affected and when transplanted to the field may suffer considerable losses during heavy rains. In the autumn of 1953 a large scale experiment was carried out in commercial tomato plant beds to determine the effectiveness of a formulation of Agrimycin, containing 22.2 percent streptomycin and 2.2 percent Terramycin, in controlling the disease. None of the treatments caused visible injury to the seedlings. In a small-scale experiment with chillis, using a compressed-air sprayer, a 300: 30 p.p.m. concentration gave effective control. (R. A. Conover, PDR 38: 405). Partial success with streptomycin for control of bacterial spot in southern Florida indicated need for further study of disease development in relation to control, according to D. M. Coe. (PDR 39: 215).

Yellow-net virus. E. S. Sylvester reported that since 1946 a yellow-net virosis had developed sporadically in tomato plantings at Berkeley and twice in fields at Salinas, California. Myzus persicae proved to be a relatively inefficient vector, transmitting the virus in about 17 percent of 217 trials with 10 individuals per plant. (Phytopath. 44: 219).

Blossom-end rot. D. C. Bain in Mississippi reported observations which showed that the percentage of blossom-end rot of tomatoes was lower on plants not staked and pruned once than on those staked and pruned at least twice, the ratio of diseased fruits on plants in the two categories being about 1:6 and 1:2 in 1953 and 1954, respectively. Drastic changes in the rate of transpiration of the staked plants due to exposure to sudden and strong air currents and to reduced mulching and shading of the roots may be responsible for their susceptibility. (PDR 38: 721).

PETROSELINUM CRISPUM LATIFOLIUM. PARSNIP: Pythium debaryanum, Pythium root

rot, was isolated from parsley near Grand Rapids, Michigan. It caused root rot and loss of vigor during the cutting season. Yields were reduced as much as 50 percent in fields where the disease was severe. (Phytopath. 44: 486).

PHASEOLUS LIMENSIS. LIMA BEAN: In Delaware, R. A. Hyre's microclimatological study showed a considerable differential between relative humidity records taken among lima bean plants and 5 feet above, whereas temperature differences were slight. For the purposes of forecasting downy mildew (Phytophthora phaseoli) temperature measurements need not be made among the plants or even in their immediate vicinity. (PDR 39: 473).

The effect of temperature on the development of downy mildew of lima bean was reported by R. S. Cox in Delaware. (Phytopath. 44: 325).

Wrinkled seed coat. Neuburg and others reported a testa deformity of lima beans in Santa Clara and Monterey Counties, California, affecting chiefly the Concentrated Fordhook variety and associated with stunting of the plants. It was responsible for lowering the grade of the frozen product and caused losses of $30,000 to $45,000 per season to some factories. On a light soil 3.4 percent of the beans were wrinkled with normal irrigation and 8.8 percent when two irrigations were omitted. (PDR 38: 464).

PHASEOLUS VULGARIS. BEAN: Fusarium spp., root rots, of bean have caused much concern to growers in Wyoming where the crop is grown under irrigation. Seed treatment tests were conducted with three varieties to ascertain the effect of certain compounds on the development of root rot and resulting yields. It was found that there was no direct correlation between treatment and severity of root rot or yield. Since Fusarium spp. are ever-present in the soil and usually attack plants after they have passed the seedling stage, not enough fungicide could be applied by treating seed to prevent infection of bean plants. (H. J. Walters. PDR 38: 856). H. J. Walters reported that increased yields brought about by supplying water to the root zone of bean plants infected with root rot may be explained by the assumption that the moisture prevents wilting and makes nutrients available near the surface of the soil. (PDR 39: 101).

Mitchell, Zaumeyer and Preston reported absorption and translocation of streptomycin by bean plants and its effect on the halo (Pseudomonas phaseolicola) and common (Xanthomonas phaseoli) blights. (Phytopath. 44: 25).

Rhizoctonia solani, root rot. Moore and Conover reported results with chemical soil treatment for control of Rhizoctonia on snap beans in Florida. Results indicated that both PCNB and the experimental compound No. 363 reduced Rhizoctonia infection on snap beans under field conditions, but until losses from this organism can be definitely determined the value of treatments for its control is conjectural. (PDR 39: 103).

Uromyces phaseoli, rust. Candicidin strongly inhibited germination of a number of fungi tested and greatly reduced infection by bean rust, according to experiments reported by Alcorn and Ark. (PDR 38: 705).

Xanthomonas phaseoli, bacterial blight. J. D. Menzies reported the effect of overhead sprinkler irrigation on the amount of bacterial disease damage to beans under the typically arid climate of the Columbia Basin region of Washington. None of the four bacterial diseases observed occurred in this area on beans irrigated by the furrow method but all appeared late in the growing season on sprinkled fields. It was concluded that in the normal climate of this area beans can be irrigated by overhead sprinkling without serious danger from bacterial diseases provided they are planted early enough to mature before October. (Phytopath. 44: 553). R. B. Marlatt reported that streptomycin was not effective against bacterial blight of pinto bean in Yavapai County, Arizona, where epidemics occur annually. (PDR 39: 213).

A rapid greenhouse method for testing beans for resistance to bean mosaic virus has been developed at the Plant Industry Station, Beltsville, Maryland, according to Thomas and Fisher. (PDR 38: 410).

Yellow bean mosaic caused by bean virus 2 is an important bean disease in Idaho and in other States of the Pacific Northwest, according to Hungerford and Hillyer. The occurrence of this virus is associated with its principal host, Melilotus alba. The disease is prevalent in sweet clover even in isolated areas far from cultivated fields. The virus is readily transmitted by several aphids. Numerous strains of this virus have been reported. From inoculation experiments, five new hosts for the type strain of bean virus 2 were discovered. (PDR 38: 621).

PISUM SATIVUM. PEA: Kingsland and Rich reported studies on the cause and control of pea root rot (Fusarium solani) in New Hampshire. This disease is a serious problem in the State. Nine soil fungicides were tested in naturally infested soil, but only Stauffer N-869 in-

creased the yield significantly in comparison with the check which became severely infected. (Phytopath. 45: 185).

From the New York Agricultural Experiment Station A. W. Hofer contributed a diagnosis of Phagus rhizobii, the well-known but hitherto, undescribed virus that destroys the root nodules of peas (Rhizobium leguminosarum) and other legumes. (Soil Sci. 77: 435).

RAPHANUS SATIVUS. RADISH: Peronospora parasitica, according to G. B. Ramsey and others, is either uncommon on radishes or has not been recognized, but root discoloration by the fungus caused heavy losses on the Red Globe variety grown in the market-garden district south of Chicago during October 1953. Similar damage to topped radishes pre-packaged in polyethylene bags was also observed at shipping points in Texas and Florida during February and March 1954. (Phytopath. 44: 384).

In Florida, Thompson and Decker described two types of hypocotyl discoloration of harvested radishes. Investigations in May 1954 showed that one type of discoloration was largely present at the time of harvest. Downy mildew, Peronospora parasitica was found associated. The second type was due to unknown causes. (PDR 39: 416).

SOLANUM MELONGENA. EGGPLANT: In New York, investigations reported by Fassuliotis and Feldmesser showed that the potato golden nematode (Heterodera rostochiensis) can attack and complete its life cycle on eggplant. (PDR 38: 789).

Verticillium albo-atrum, Verticillium wilt. In the 1954 survey for New Mexico, Leyendecker reported that Verticillium wilt was found for the first time causing extreme damage on eggplant and okra. Large commercial plantings in the Mesilla Valley suffered from 50 to 90 percent loss in production. The disease was also found affecting eggplant under field conditions north of Vernalillo, New Mexico. (PDR 38: 789). During 1954 Staffeldt and Leyendecker observed Verticillium wilt of okra and eggplant under field conditions in Southern New Mexico. The commercial planting of okra in which Verticillium wilt was studied was a 4-acre field. By the end of the season from 90 to 95 percent of the plants were diseased. Yield was very severely affected by the wilt disease. It was estimated that 75 percent of the crop was lost in this one field. A 3 1/2-acre eggplant field on the same farm was also found to be severely infected with Verticillium wilt. The disease appeared early in the season and continued to increase in incidence until frost, when 95 to 98 percent of the plants were infected. The grower considered the crop a complete loss. (PDR 39: 589).

SOLANUM TUBEROSUM. POTATO: Several species of Chaetomium were associated with a foliage disease of greenhouse-grown potatoes in South Dakota, according to Allyn A. Cook. Disease symptoms comparable to those from which the original isolations were made were never obtained on inoculated plants, but the results of preliminary experiments indicated that the species of Chaetomomium tested were capable of inducing a foliage disease of potatoes, either by indirect infection or by production of toxic materials. (PDR 38: 403).

Erwinia atroseptica, black leg. Laboratory and greenhouse studies in Maine have shown that treating potato seed pieces in solutions of streptomycin sulfate, with or without the presence of Terramycin hydrochloride, was effective in reducing both black leg and the seed-piece decay caused by black leg bacteria. Treating seed pieces in Agrimycin solutions on commercial farms reduced the amount of seed-piece decay, generally increased the emergence in the field, greatly reduced the percentage of blackleg, generally improved the color size and vigor of the plants, and always increased the yield rate. (Reiner Bonde, PDR 39: 120).

Heterodera rostochiensis, golden nematode. Fassuliotis and Sparrow reported that X-ray irradiation at certain dosages interrupted the life cycle of the golden nematode. (PDR 39: 572). None of the filtrates from 22 different bacteria and fungi tested by W. F. Mai proved to be toxic to encysted larvae of the potato golden nematode. Data were presented only for encysted larvae treated for 30 minutes in 1:9 dilutions. (PDR 38: 545). Two organic mercurials used in the Netherlands were tested for the control of the potato golden nematode in New York by Feldmesser and Shafer, with promising results. (PDR 39: 13).

Phytophthora infestans, late blight, see also under tomato. Reiner Bonde reported results of a late summer potato late blight survey in Aroostook, Maine. (PDR 39: 86).

Streptomyces scabies, scab. Houghland and Cash described two methods of inoculation with S. scabies which have proved very effective in establishing potato scab in the field at the Plant Industry Station, Beltsville, Maryland. (PDR 38: 460).

Pentachloronitrobenzene was the most effective of several soil fungicides tested for the control of scab, according to Houghland and Cash. (PDR 38: 777).

A. A. Cook reported association of several strains of virus X with "freckles", observed in potatoes in South Dakota. (PDR 38: 458).

Evidence associating the occurrence of potato internal brown spot with hot dry weather was reported by B. A. Friedman. He also reviewed the literature on internal brown spot and similar troubles. (PDR 39: 37).

Leaf roll, unidentified (probably not of virus origin), according to Volk and Gammon, occurring on potatoes in Florida was most severe on relatively new lands where there are very acid conditions and high ammonia content. It appeared that this leaf malformation could develop at any stage of growth if the plant had insufficient supplies of nitrate. In Florida tests deficiency of potassium was thought to be an enhancing factor. Side dressings of nitrate at planting and potassium nitrate at blossom time completely reduced nutritional leaf roll of potatoes grown on light, strongly acid soil. (Amer. Potato Jour. 31: 83).

Yellow spot virus in potato varieties (mostly Katahdin) in Aroostook County, Maine was reported by Bonde and Merriam. Experiments have shown that the virus can be eliminated by planting tuber unit seed plots and by careful selection and propagation of healthy tuber units. (Phytopath. 44: 608).

SPINACH: OLERACEA. SPINASH: W. L. Smith, Jr. reported the effectiveness of streptomycin in reducing post-harvest bacterial soft rot of spinach leaves packaged in plastic bags. (Phytopath. 45: 88).

PLANT DISEASE EPIDEMICS AND IDENTIFICATION SECTION